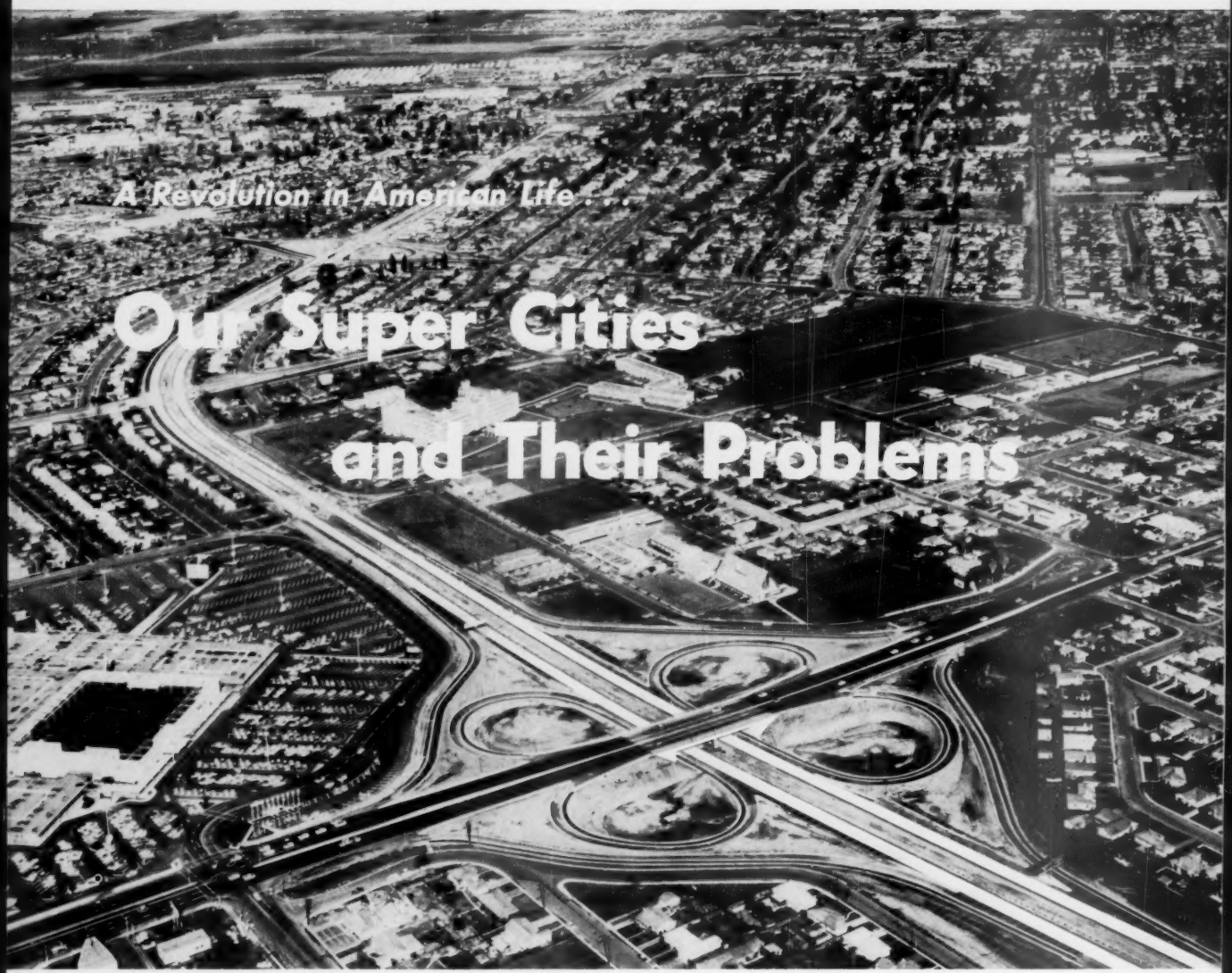
The Magazine of the Registered Professional Engineer

American Engineer

AUGUST 1960



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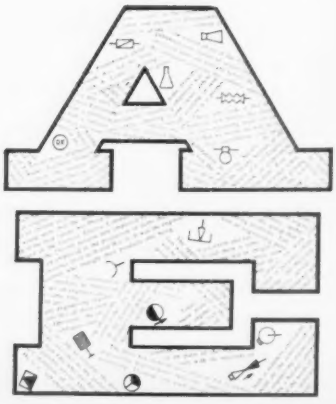

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AUGUST 1960
Vol. 30, No. 8

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Letters to the Editor

No Crisis . . .

Dear Editor:

Just a note to commend you for running the very excellent article, "Let's Stop Criticizing American Education!"

It is time someone spoke back to those who twist statistics in this field in order to "prove" that modern teaching methods are not turning out good students. We do not have a crisis in education in this country. We have an educational system that is teaching more young people to do more things —with their heads as well as with their hands—than ever before.

There is no virtue in change for the sake of change, but maintenance of the status quo is certainly not a sign of progress. If our professional educators were still teaching today the subject matter they were teaching thirty years ago, professional engineers would be among the first to say, "There's something wrong here." And they would be right.

DUANE L. CRONK
Washington, D. C.

Liked Education Article . . .

Dear Editor:

Congratulations on printing Dr. Russell's fine article on American Education in the July issue. Congratulations to Dr. Russell for writing it. It requires careful documentation as well as courage to take issue with a popular viewpoint, especially when that viewpoint is supported by leading figures in public life. In his article, Dr. Russell demonstrates that he has both.

The fact that one so closely associated with education on the national level can speak and write so forthrightly about it is, in itself, a source of strength to our educational system. In the final analysis, this freedom of expression not only makes our education, but our whole system of government strong, responsible and capable of greatness far beyond any dictatorship.

What we do with our "inventory" of technically educated people is a different matter. Our efficiency in using the skills of these people may need more improvement than the education we give them. Much is written about freeing the engineer for professional work by the use of technicians for the routine, time consuming tasks. This certainly makes sense for engineers just as it does for doctors to turn over lab work and patient care to technicians and nurses. This is a local problem which each employer of engineers has to face and solve for himself. On the national level, there is an area that should get attention.

We are in earnest competition with the Soviet Union whether we like it or not. Periodically, with the announcement of a new "first" in space or missile technology, there is a frenzy of elation or fear. We spend large sums of money for the C.I.A. and for U-2 flights looking for information that is hard to find, but we ignore a source of information that is readily available. I refer to published scientific findings.

These publications contain a wealth of information that can suggest new avenues of research, substantiate findings, save the time and cost of "blind-alley" research, and advise us of progress in other countries. This material, when published in a foreign language, is lost to all but a very small percentage because only a very few companies can afford a technical translator and far too few of us are able to translate for ourselves, and then seldom more than one language.

A central agency to translate all technical articles and make them available on subscription would allow us to tap a huge new source of information. It would allow better utilization of the "products" of our educational system.

ALVIN H. SHAIRMAN, P.E.
Worcester, Mass.

Good Presentation . . .

Dear Editor:

Please accept my congratulations for publishing the article by James Russell in the July issue of the AMERICAN ENGINEER. It is the kind of presentation which seldom reaches a lay audience but should. I do hope that the people will read it, heed it, but not stop the constructive criticism of American education.

JOHN M. MICKELSON
Director, Teachers College,
Division of Secondary Education,
Temple University,
Philadelphia, Pa.

SA Trip . . .

Dear Editor:

Congratulations on (the South American) trip report in the AMERICAN ENGINEER.

As an engineer with two years "time" in Venezuela the authors have managed to catch the pulse of South American criticism of American engineers, or indeed, Americans, in a very short time. Certainly learning the language is the most vital requisite for effective work and general relations. How else can one perform and communicate his experience and ideas to the people with whom he is working and living.

ROGER E. GOODWIN, P.E.&R.A.
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(Circle 1 in Readers' Service Dept.)

University surveys indicate:

STARTING SALARIES OF ENGINEERS ARE DECEPTIVELY HIGH

By James M. Jenks

TWO SEPARATE STUDIES of the salaries made by college graduates appear to contradict the commonly held belief that engineers today make out better financially than their classmates who major in non-technical subjects.

Both surveys were conducted by large universities. The first polled graduate engineers; the second, company executives. And both resulted in identical findings! That is, the average engineer today – despite a deceptively high starting salary—climbs fast but not far.

The need for technically trained men in recent years has exceeded the supply to such an extent that companies have been forced to bid for their services—to actually set-up "recruiting" offices on college campuses all over the country. Thus, starting salaries have gone up and up. But the income ceiling for these technically-trained men is lower than that for managerial personnel.

Despite the substantial head start engineers have, the differential in money earned over a ten-year period averages out at $7,000 more for the management man.

And from the tenth year on, the administrator's salary obviously outstrips that of the engineer by a wider and wider margin.

This, of course, is not to say that engineering students would be wise to shift to the study of business administration—or that working engineers face a bleak future. Quite to the contrary, the continuing growth of technology means that men with technical backgrounds are as ideally qualified for the highest rewards industry has to offer—*if they also have a knowledge of the underlying principles of business.*

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Political Parties Urged to Adopt Engineering 'Plank'

- Pres. Hull Testifies Before Democrats
- Republican Group Hears C. G. Roush

The National Society urged committees of both the Democratic and Republican National Conventions in June to develop party platforms which would include policies that can provide a favorable climate for achieving adequacy in numbers and qualifications of engineers and scientists.

Noah E. Hull, new NSPE president, testified before the Platform Committee of the Democratic National Convention in Los Angeles, while C. G. Roush, 1959-60 chairman of the Society's Policy Review Committee, appeared before the Education, Science and Technology Subcommittee of the Republican National Convention in Chicago.

Both men spoke on "the absolute necessity for the governing body of our nation to recognize and encourage the utmost development and utilization of our engineering and scientific manpower."

The National Society's suggested "plank" covers policies concerning education, attracting engineers and scientists to government service, utilization of engineers and scientists for professional pursuits, effective utilization of engineering and scientific talent in private practice, and legislation to provide engineers and scientists with fair and nondiscriminatory status under Federal laws.

ASCE Members Called on To Set Good Example

The president of the American Society of Civil Engineers has called upon its 45,000 members to set a "truly professional" example in dispelling "a growing disregard for honesty and fair dealing in business relations."

Frank A. Marston said in his annual address at the ASCE convention in Reno, Nev., that the civil engineer must not only be competent in his technique but his behavior must conform to the general requirements for professional behavior which have been developed over the years by the learned professions.

"Today," said Mr. Marston, "there appears to be a growing disregard for honesty and fair dealing in business relations, in TV shows, in some labor union managements, in competition for engineering projects, and in other phases of everyday life.

"This is to be regretted greatly if it applies to a member of the engineering profession," he added.

Testimony Presented to Democrats, Republicans

Spokesmen for the National Society appeared before the major political parties last month urging that an engineering "plank" be adopted in their platforms. Shown in the left photo is Noah E. Hull, NSPE president, as he testified before the Platform Committee of the Democratic National Convention. In the photo at right, C. G. Roush, 1959-60 chairman of the Society's Policy Review Committee, discusses the matter with Senator Gordon Allott of the Education, Science and Technology Subcommittee of the Republican National Convention.

"This Month"

"Super" may be an overused word in America (super markets, super service, and on and on) but it is about the only word we could think of to adequately describe what is happening to our cities as old boundaries fade away and one metropolitan area links up with another. These super cities bring problems and so many are engineering in nature. Check "Our Super Cities and Their Problems," page 19.

"Industry's Role in Federal Research and Development," page 25, begins with these words: "The purpose of this presentation is to acquaint the reader with the work, organization, and methods of the industry which performs research and development under contract with the Federal Government. . . ." That's it and it is an exhaustive study.

The JETS organization has selected its 1960 JETS National Junior Engineer—a young man from Ohio—and on pages 30-32, AE's camera follows him on a tour around Washington, D. C.

We ask on pages 34-35 if the civil engineer is the space age's forgotten man. Is he going the way of the Model-T? Here is an excellent discussion by a leading civil engineer.

And on page 33, another Board of Ethical Review case is studied. Page 40 begins the listing of national committees for President Noah Hull's 1960-61 administration.

Reviewing the news "This Month:"

General. Page 6. The top news is that the engineering profession was represented at the political conventions in appearances by NSPE officials before platform committees. In another important story, the president of the Colorado professional engineers has called for a sweeping investigation into press reports of alleged unprofessional conduct of Colorado engineers. Page 8.

Consulting. In a recent article in Reader's Digest, the private consultant came in for severe criticism as regards his part in the huge highway program. The NSPE has taken issue with the conclusions. Page 10.

Education. Page 12. The headlines: Professional Schools Needed, Educator Tells Conference . . . GMI to Grant Degrees in Electrical Engineering . . . Lehigh Civil Engineering Grads to Start at $483 . . . Powerful Leadership Only Solution, Says ASEE Head . . . 1960 Graduates Find Employment Favorable.

Government. On page 14 is the last word on H.R. 10, the House-approved self-employed retirement bill. The Senate has begun debate on their Finance Committee's substitute version. In other headlines: Opposition Renewed on Common Situs Picketing . . . Objectionable Feature Deleted in Bidding Bill . . . Senate Approves Bill Expanding Water Plan.

Industry. The lead story here, page 16, informs us that the Sperry Gyroscope Company's bid for an injunction to stop the independent Engineers Association from affiliating with the International Union of Electrical Workers (IUE), has been turned down by the U. S. District Court.

Kenneth E. Trombley
Editor

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Circle 6 in Readers' Service Dept.)

$4 Million to Be Spent On Asphalt Research

Refiners of petroleum asphalts will spend more than $4 million on product research in 1960.

In his report to the board of directors, President J. E. Buchanan of The Asphalt Institute, College Park, Md., reported that a survey of member companies disclosed that $4,100,000 is earmarked for research in the area of asphalt technology during the current year. These combined programs, he said, will employ 216 full-time researchers, engineers and technicians.

Unprofessional Conduct Intimated By Newspaper Reports in Colorado

Vernon E. Konkel, president of the Professional Engineers of Colorado, has announced that his organization will initiate an investigation of reports in the press alleging unprofessional conduct by Colorado engineers.

At the same time Mr. Konkel appointed an Information Committee in what he termed an attempt to eliminate conditions fostering competitive bidding.

The Committee will be composed of engineers employed by organizations retaining outside engineering services and who participate in negotiations regarding such services.

Mr. Konkel declared: "This Committee will be available to help any prospective client determine a fair range of fees for any particular project, leaving the client free to choose an engineer on the basis of reputation and presentation and with no fear of being over-charged because of lack of competition."

He invited potential clients, particularly municipalities, interested in obtaining the services of this Committee to contact the Professional Engineers of Colorado.

Mr. Konkel said during the past several months articles have appeared in various newspapers indicating engineers have been bidding on engineering assignments.

"In all fairness," he added, "many of the engineers involved have flatly denied such bids were submitted."

Mr. Konkel said the Ethical Practices Committee of the PEC will ask each engineer accused of submitting bids to present his position. The Committee, headed by Denver Consulting Engineer Al Ryan, has been ordered by the PEC to publicize its findings.

Mr. Ryan said: "By saying bids were received for engineering services, the newspapers have accused the participating engineers of unprofessional conduct."

The Ethics Committee chairman outlined three possible courses open to an accused engineer:

1. To demand and receive a retraction of the story.
2. Institute legal proceedings to re-establish his reputation.
3. Or face the consequences of unprofessional conduct.

Robertson Honored by AIEE

Elgin B. Robertson (second from left), a former president of the American Institute of Electrical Engineers, is shown receiving a certificate of honorary membership in the Institute from C. H. Linder (far right), 1960-61 AIEE president, at the summer general meeting. Looking on are J. H. Foote (left), 1959-60 Institute head, and Lee A. Kilgore, director of engineering, Westinghouse Electric Corporation, who received the Lamme Gold Medal.

County Engineers to Meet September 19-21

Members of the Board of County Consultants to the U. S. Bureau of Public Roads will participate in a panel discussion, "Survey of County Highway Problems," at the eighth annual National Highway Conference for County Engineers and Officials, to be held at Atlanta, Georgia, September 19-21, under the auspices of the County Division, American Road Builders' Association. The Georgia County Commissioners Association will be host to the conference.

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Magazine Article Attacks Consultants; NSPE Replies

- Charges 'Unjustified,' Says Society
- Highway Program Called 'Big Bungle'

With sweeping charges of "mismanagement" in the "extravagant use of private engineering consultants" on the Interstate Highway Program, a July *Reader's Digest* article entitled "Our Great Big Highway Bungle" has added fuel to the fire started by recent attempts to discredit the Federal-aid road program. The story, written by Karl Detzer, has drawn a quick reply from Paul H. Robbins, executive director of NSPE.

Following the line adopted by the General Accounting Office in previous attacks, Mr. Detzer calls the use of consultants on the Federal road program a "violation of Federal policy" and implies that low ethical standards on the part of consultants have resulted in the overelaborate design of portions of the highway network.

In his reply, Mr. Robbins points out that Bureau of Public Roads regulations, backed by the 1958 Highway Act, authorize the use of private consultants and call for the fullest possible use of small business enterprises in the construction of the interstate highway system. In answer to charges that consultants are guilty of overdesigning roads to increase fees, he stated that most highway engineers prefer not to operate under per-cent-of-construction contracts, and expressed strong resentment to implications that the ethics of the profession mean little to the average engineer.

Condemning as unjustified the charge that state-employed highway engineers have been negligent and deficient in the performance of their duties, Mr. Robbins said, "The National Society of Professional Engineers insists that engineers in public service as a group are competent and dedicated professional personnel who perform a vital function in the public interest. Both private consultants and Federal and state engineering employees are an essential element in the planning and execution of the highway program. Inflammatory articles citing only the few bad examples in a program and completely ignoring the overwhelmingly successful portion of the operation can only be harmful to the public by destroying confidence in a much-needed program."

In support of the NSPE stand was a Bureau of Public Roads analysis of the article inserted in the *Congressional Record* by Senator Hruska of Nebraska. The BPR called attention to the fact that existing review and control procedures make it impossible for consultants to enhance their fees through extravagant design, and stated that the road program would never have gotten off the ground were it not for the contributions of consultants. "The use of consulting engineers for some of the work gives the States greater flexibility; enables them to secure experts for specialized situations; brings outside thinking into solving problems; creates incentive for better production of the States' forces by providing a yardstick of accomplishments; and enables work to be accomplished that would be impossible otherwise. The objective has been to get the design work done as efficiently and effectively as possible."

In an attempt to support his charges of low ethics and high fees, Mr. Detzer viewed-with-alarm the dollar amounts paid to consultants in Pennsylvania, New Jersey, and Maryland. The NSPE executive director noted in his rebuttal, however, that the author failed to show how such fees were excessive in relation to the amount of work performed.

In the BPR analysis, it was pointed out that preliminary design work performed by consultants before states could organize their own forces had made possible material savings in right-of-way acquisition costs. In addition, stated BPR, "the earlier completion of interstate projects (through use of consultants) with modern safety features, has resulted in tremendous savings in lives and in injury and property damage. Certainly these benefits exceed the monetary value of all the work discussed."

In conclusion, stated Mr. Robbins, "In any program involving such huge outlay of funds as the interstate highway program there are bound to be some cases of misuse of funds and skulduggery. However, any inference that a few isolated cases prove that the entire program is rotten with recklessness, extravagance, special privilege, thievery, etc., is a great disservice to the great majority of sincere and honest individuals and firms involved in the work, and should be so recognized by the American public."

Meetings of Note

American Institute of Electrical Engineers—Pacific General Meeting, August 8-12, El Cortes Hotel, San Diego, California.

National Council of State Boards of Engineering Registration— Annual Meeting, August 18-20, Hotel Multnomah, Portland, Oregon.

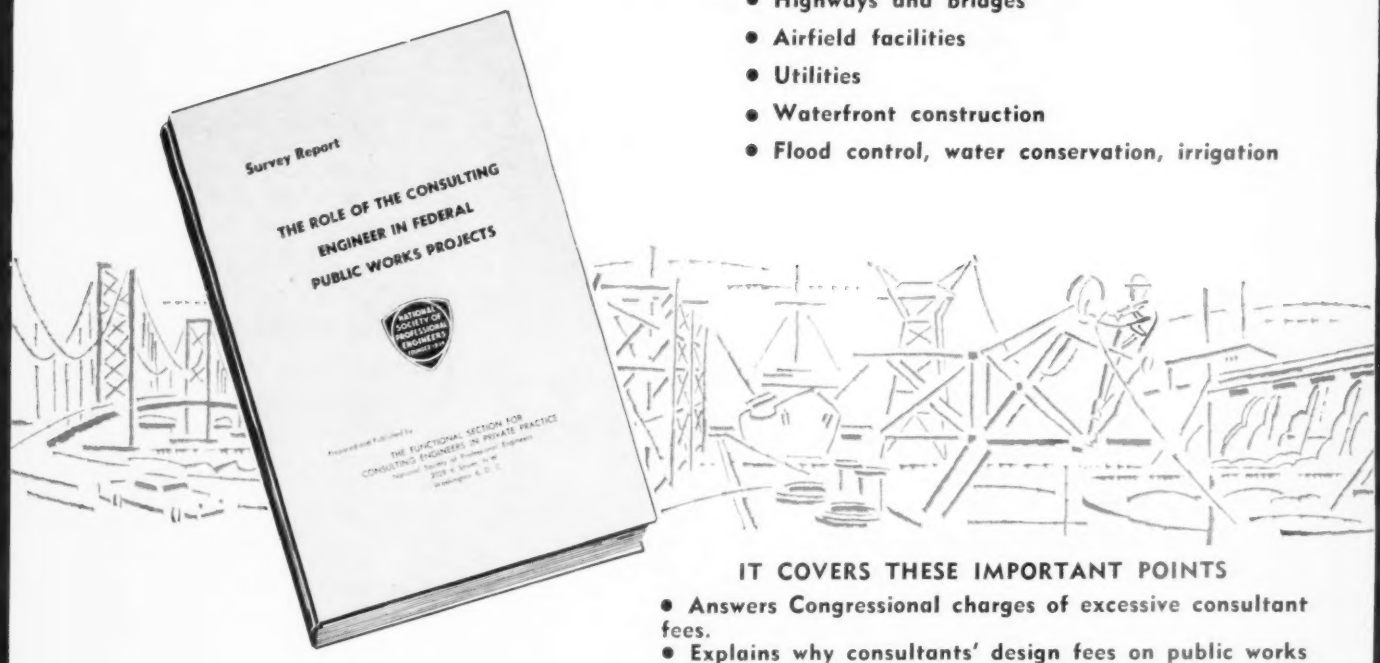
Western Electronics Show and Convention—Annual Event, August 23-26, Memorial Sports Arena, Los Angeles, California.

Survey Report: THE ROLE OF THE CONSULTING ENGINEER IN FEDERAL PUBLIC WORKS PROJECTS

now available!

FOR THE FIRST TIME, *FACTS* ARE AVAILABLE. Here at last is factual information on the use of consulting engineers on Federal public works projects. In answer to charges of excessive fees, 118 consulting firms report on 1,464 engineering service contracts with seventeen different agencies giving actual fees, construction costs, and types of projects. This 144-page report has been sent to Congressional committees and Federal agencies, and contains full information on many types of public works construction, including:

- **Highways and bridges**
- **Airfield facilities**
- **Utilities**
- **Waterfront construction**
- **Flood control, water conservation, irrigation**



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Professional Schools Needed, Educator Tells Conference

Professional schools of engineering are needed in the U.S. to meet the challenge of technological development, it was reported at the recent three-day Conference on Civil Engineering Education at The University of Michigan.

The future of engineering education lies in the development of professional schools superimposed on the undergraduate, pre-engineering curriculum, declared Jack E. McKee, professor of sanitary engineering, California Institute of Technology. The conference was held under the auspices of the National Science Foundation.

"Administered by engineers on a par with the graduate schools of other professions, such engineering schools might award master of engineering and doctor of engineering degrees for the engineer who intends to practice in the profession, along with the M.S. and Ph.D. for men who plan to teach or do research," Professor McKee suggested.

"Graduates of these programs," he told the assembly of the nation's outstanding educators in engineering, "will constitute the truly professional engineering fraternities of the future, with support from subprofessional personnel holding baccalaureates, or with training as technicians."

Official delegates, one from each of 138 colleges, universities and institutions with engineering curriculum were invited to attend the conference and vote on proposals for the advancement in engineering education. The meetings were sponsored by the American Society of Civil Engineers and Cooper Union, of New York, and attended by educators, practicing engineers and industrialists from all parts of the country.

GMI to Grant Degrees in Electrical Engineering

Baccalaureate degrees in electrical engineering will be granted by General Motors Institute for the first time in 1963, James E. Goodman, chairman of the Institute's board of regents and vice president of General Motors, has announced.

The school's regents voted to grant the electrical engineering degree in addition to the mechanical and industrial engineering degrees presently awarded.

"The addition of the electrical engineering curriculum is the result of the growing demand from General Motors plants for young men educated in this field," Guy R. Cowing, GMI president, pointed out.

"The aim is to prepare qualified young men for the divisions of the corporation with a type of educational background in electrical engineering suited to the needs of General Motors," he said.

The new curriculum is directed toward three important areas of need for an electrical engineer in General Motors: product design, plant engineering, and process engineering.

More than 2,000 students are enrolled in GMI's cooperative engineering programs. Approximately 3,900 graduates are currently employed by General Motors.

Lehigh Civil Engineering Grads to Start at $483

Civil engineering graduates of Lehigh University will receive an average starting salary of $483 a month. Last year, it was $478.

That was the report of Everett A. Teal, director of placement and counseling services, in a recent job analysis for this year's senior class.

Electrical engineers top the list with an average starting salary of $540, a hike of seven per cent over $503 in 1959. Mechanical engineers were next with a $528 average, a boost of six per cent over a year ago.

The report indicates that eighteen more companies sent representatives to the Lehigh campus this year than in 1959. Personnel men from 340 companies held 7,843 interviews with the seniors. Included were 328 interviews with twenty-six majors in civil engineering by ninety-three companies.

Powerful Leadership Only Solution, Says ASEE Head

Powerful leadership in engineering education is the only solution to the twin problems of quantity and quality in the young engineers of today and tomorrow, according to Dr. B. R. Teare, Jr., president of the American Society for Engineering Education.

". . . It is high time that we bring genuine research techniques to bear on problems in education just as we would in engineering, making use of the most powerful methods of psychology education, and other relevant disciplines," he said.

Dr. Teare, dean of the College of Engineering and Science at Carnegie Institute of Technology, spoke at the opening session of the 1960 ASEE annual meeting at Purdue University.

Pointing out that the quantity problem is deceptive, Dr. Teare explained that until twenty years ago we turned out more engineers than were needed for professional practice and there was a fair level

USE AE'S READERS' SERVICE DEPT.—SEE PAGE 57.

of balance between supply and demand.

The wartime developments of weapons and weapons systems of unprecedented technical complexity, continuing into the current Space Age has dramatically forced the recognition that more and better educated engineers are needed for advanced developments.

"The supply and demand for engineers and scientists in future years has been analyzed by Brown, Bonner, and Weir in their book, *The Next Hundred Years*, and they conclude that by the year 2,000, only forty years away, the demand will be more than double the available supply . . .," he added.

1960 Graduates Find Employment Favorable

This year's engineering graduates continued to find a very favorable employment situation. According to a survey by the Engineering Manpower Commission of Engineers Joint Council, eighty-two per cent of engineering graduates had definite plans, and another eleven per cent had job offers they were considering. It was anticipated that virtually all the new engineers would be placed.

As of May 20, the plans for prospective graduates were divided as follows: 62 per cent with jobs, 11.3 per cent considering jobs, 8.0 per cent entering military service, 10.1 per cent entering graduate studies, 1.2 per cent with other specific plans. In all cases, these figures do not vary more than 1½ per cent from a comparable 1959 survey.

Over a period of three years, job commitments for chemical engineers surveyed climbed most sharply.

The limited data obtained in other fields indicates the graduates in business and commerce, and in arts and science were about ten per cent below engineers in definite commitments.

Survey information was supplied by deans of engineering and placement officers from over 100 colleges and universities throughout the United States and covered 15,000 engineering graduates.

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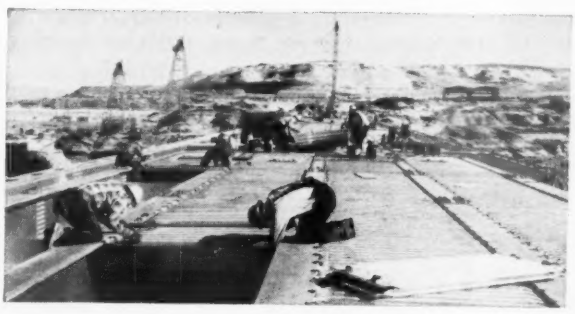

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(Circle 4 in Readers' Service Dept.)

Debate in Senate Begins on Modified Version of H.R. 10

Debate has begun on the Senate Finance Committee's substitute version of H.R. 10, the House-approved self-employed retirement bill. The Senate bill, which includes most of the recommendations of the Treasury Department, would (unlike the House bill), require that before any self-employed individual could obtain a retirement deduction for himself, he would also have to contribute on a nondiscriminatory basis to a fund for retirement benefits for his employees who are covered under the plan. The Senate bill also adds several restrictions to existing law covering corporate retirement plans for owner-employees (those owning more than ten per cent of the business and who also perform personal services for which they receive earned income).

In general, the Senate version would permit a self-employed person to contribute to a retirement plan for himself, and to deduct each year not more than ten per cent of his earned income or $2,500, whichever is smaller. To obtain the deduction for himself, however, he would have to establish a nondiscriminatory plan for his employees, although part-time, seasonal, and temporary employees may be excluded from pension coverage as may those who have not been employees for more than three years.

Treasury estimates indicate that the revenue cost of the Senate bill will range between $150 and $250 million annually, as compared to the $365 million cost estimated for the House-passed version. The Senate Finance Committee (S. Rept. No. 1615) on H.R. 10 declared that the lower cost of the Senate bill is due for the most part to the fact that:

(a) Additional deductions in excess of the basic annual limitations of ten per cent of earned income or $2,500 will not be allowed for individuals who are aged fifty or more, as under the House bill;

(b) pension contributions under the Senate bill must be based on self-employment income only to the extent it constitutes earned income, whereas the House version would permit contributions based on self-employment income without any reduction; and

(c) because self-employed persons must cover their employees as well as themselves under the Senate bill, they will probably be more reluctant to establish retirement plans than they would have been under the House bill.

Continued floor discussion and consideration of H.R. 10 will be high on the Senate agenda when legislative activity resumes in August.

Opposition Renewed on Common Situs Picketing

In a statement presented to the Senate Subcommittee on Labor, NSPE reaffirmed its previous stand that pending amendments to the Taft-Hartley Act relating to "common situs picketing" could jeopardize the rights of engineering and surveying employees in the construction industry. The pending bill (S. 2643), sponsored by Senator John F. Kennedy, would allow building trades unions a special exemption from the secondary boycott prohibitions of the Act, and permit them to picket and shut down an entire construction project even though the union's dispute was with only a single contractor or subcontractor.

The National Society's statement cited several instances in which building trades unions have engaged in pressure tactics to organize engineering and surveying employees, force their replacement on the job by union members, or coerce construction contractors to cease doing business with certain engineering and surveying firms. These examples of union pressure can be prevented in most instances under present provisions of the law, NSPE said, but "we seriously doubt that existing protection could be maintained should the proposed amendments be enacted."

A companion House version, which first drew the Society's attention, has been approved by the House Labor Committee, but is still awaiting clearance from the Rules Committee.

Objectionable Feature Deleted in Bidding Bill

NSPE concern over the effect of pending amendments to the Armed Services Procurement Act on the negotiation of contracts for professional engineering services has resulted in the elimination of one of two features specifically cited as objectionable.

The House Armed Services Committee, acting on the Society's recommendation, eliminated from a clean bill the requirement that a written justification be made for the negotiation of professional service contracts. NSPE, in a statement to the Committee, had characterized such a proposed requirement as burdensome and unnecessary.

A second provision in the bill which also drew comment from the National Society, was not materially changed by the Committee. That language would require that all persons or firms wishing to contract with the armed services first submit "proposals" in which price and other factors would be considered, and then participate in written or oral discussions on their

Use AE's Readers' Service Department— See Page 57!

proposals with the contracting agency. Although this provision could be construed to apply to the procurement of professional services, the House Committee report indicates that its purpose is to provide a statutory definition of "negotiation," and to require the military agencies to conduct preliminary discussions with contractors.

In an effort to assure the continuation of qualification as the primary consideration in the awarding of a contract for professional services, NSPE presented a statement to the Senate Armed Services Committee, to whom the bill was referred following its passage by the House. The Society urged the Senate group to make certain technical changes in the questionable provision "to clarify the intent to permit the negotiation of contracts for professional services without the necessity for prior oral or written discussions." (H.R. 12572).

Senate Approves Bill Expanding Water Plan

An expansion in scope of activity and available funds for the 8-year old saline water program has been approved by the Senate. The bill (S. 3557) will increase to $20 million the funds authorized for the program to permit its continuation at an accelerated pace. The measure also authorized the construction and operation by the Office of Saline Water of a central test site and laboratory with a scientific staff to be continuously engaged in research, testing, development and programming.

In its report on the bill, the Senate Interior Committee declared that the Nation's water needs will continue steadily to mount and that research and development, beyond what can or will be done in private industry, must be carried on for an indefinite period in the future. The report added, however, that the operation of the proposed central test laboratory "would not mean any diminution of outside contract work. In fact, it would open up more possibilities for outside contracts."

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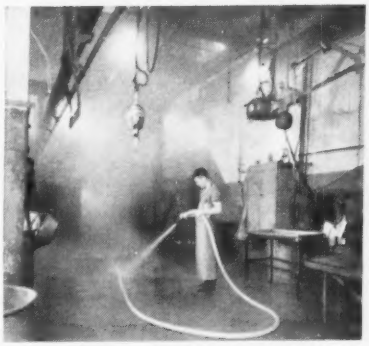

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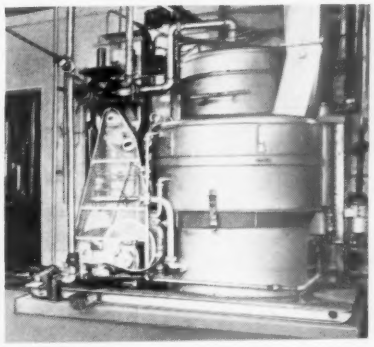

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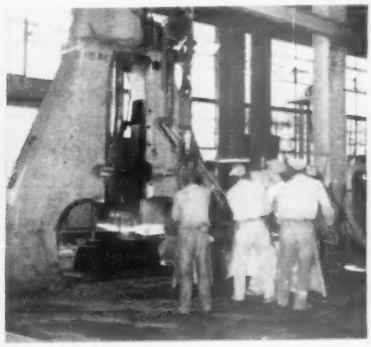

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(Circle 5 in Readers' Service Dept.)

Court Denies Injunction in Sperry Affiliation Case

Sperry Gyroscope Company's bid for an injunction to stop the independent Engineers Association from affiliating with the International Union of Electrical Workers (IUE) has been turned down by United States District Court Judge William B. Herlands. The company had sought the injunction on the grounds that the union action violated a contract requirement that the affiliation election be held among the entire bargaining unit rather than just among union members.

The union went ahead with an election restricted to union members claiming that any contract provision giving nonmembers the right to a voice in the affairs of an organization is illegal and unenforceable. Without commenting on the validity of the contract clause, Judge Herlands ruled that provisions of the Norris-LaGuardia Act prohibit the issuance of injunctions in labor disputes. He said that the company may if it so desires seek damages and/or declaratory judgment in a new action, at which time the court would rule on the legality of the contract clause.

While the company has not yet indicated what its next step will be, the union accepted a local charter from IUE President James B. Carey at a meeting in June.

It is reported that a group of nonunion engineers at Sperry has started a petition to get the signatures of the required thirty per cent of the unit necessary to hold a decertification vote. Such a move, however, would require a vote among the entire unit without a separate voice for professionals.

Another possibility, which would make the legality question of the disputed contract clause purely academic, is that the NLRB may follow established policy and require a new representation election. In recent cases the NLRB has held that before any change in affiliation will be certified, an NLRB sanctioned representation election conducted among the entire bargaining unit must be held, with professional employees being given a separate vote.

Under this policy it is likely that a union request for a switch in official certification from the Engineers Association to the IUE would be denied, leaving it up to the union to then put in a routine request for a representation election.

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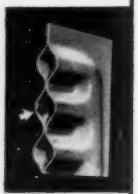

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Union to Have No Voice In Merit Review Plan

A Federal court has dismissed a suit by the Association of Professional Engineering Personnel to bar the Radio Corporation of America from making unilateral changes in the company's merit review plan.

Both sides used the contract to back up their cases, with each focusing on different sections. The union pointed to the section which says, "The company intends to make certain changes in the Plan for the purpose of improving it and these changes will be completed so that the Plan as so revised will become effective on October 1, 1959, for the determination of merit increases to be granted on and after the date." The union interpreted this to mean that once the company had completed its changes and adopted the plan on October 1, any further revisions required union approval.

After October 1, however, the company did make further changes, and when the matter came before the court, pointed to a previous contract which stated: "This plan will be established by the Company and its provisions will not be subject to collective bargaining."

In rendering its decision, the court said, "These agreements constitute the basis for the adoption of such a plan, and, in the court's estimation, specifically gave to the company alone the right to prepare, adopt and put into effect such plan. The only right the court finds on the plaintiff-union is to make suggestions regarding the plan and its modifications or revisions. . . ."

"My company's computer has forgotten more than his will ever know."

Strictly Business

Personalities . . . **President Frank N. Piasecki** has announced the appointment of **Frank E. Mamrol** to the position of chief engineer of **Piasecki Aircraft Corporation,** Philadelphia, Pa. . . . **Frederick B. Hull** has joined the Process Equipment Division of the **Bethlehem Foundry and Machine Company,** Bethlehem, Pa., as a process engineer . . . **Thomas E. Ban** has been elected vice president-research of **McDowell Company, Inc.,** Cleveland, Ohio . . . **Karl Kraus** has been appointed to the post of director of engineering at **Ken-Tron Corporation,** Lynn, Mass. . . . The appointment of **Daniel S. Gustin** as engineer-in-charge of the Manchester, N.H., plant of Sylvania Lighting Products, a division of **Sylvania Electric Products Inc.,** has been announced . . . **Charles J. Disser** has joined the staff of **General Magnetics, Inc.,** Minneapolis, Minn., as senior electrical engineer . . . **Dr. Johnstone S. Mackay** has been named director of the Research and Development Department of **Pittsburgh Chemical Company,** Pittsburgh, Pa. . . . **Eugene Koenig** has been appointed a vice president of **Keuffel & Esser Company,** Hoboken, N.J. . . . **Howard R. Cooper** has joined the Engineering Department of **Photocircuits Corporation,** Glen Cove, N.Y.

Mr. Mamrol

The appointment of **Roland V. Fisch** as vice president in charge of manufacturing and engineering for **The Ohio Rubber Company,** Willoughby, Ohio, has been announced . . . **S. A. Harvey,** president of **Copymation, Inc.,** Chicago, Ill., has announced the appointments of **Robert C. Goodman** as chief engineer and **Paul W. Norman** as assistant chief engineer . . . **Charles J. Fisher** has been elected vice president of manufacturing by the **Wyomissing Paper Products Company,** Reading, Pa. . . . **The Portland Cement Association** has appointed **Homer A. Humphrey** as district engineer of its Southern New England District with headquarters in Boston, Mass. . . . The promotion of **John C. Loos, Jr.,** as assistant to the president, and **John E. Pearah** as chief engineer of **The American Well Works,** Chicago, Ill., have been announced . . . **Hauck Manufacturing Company** has announced the appointment of **David M. Given, Jr.,** as production engineer . . . **George E. Metter** has been appointed a senior applications engineer by the Plastic Products Division, **International Resistance Company,** Philadelphia, Pa.

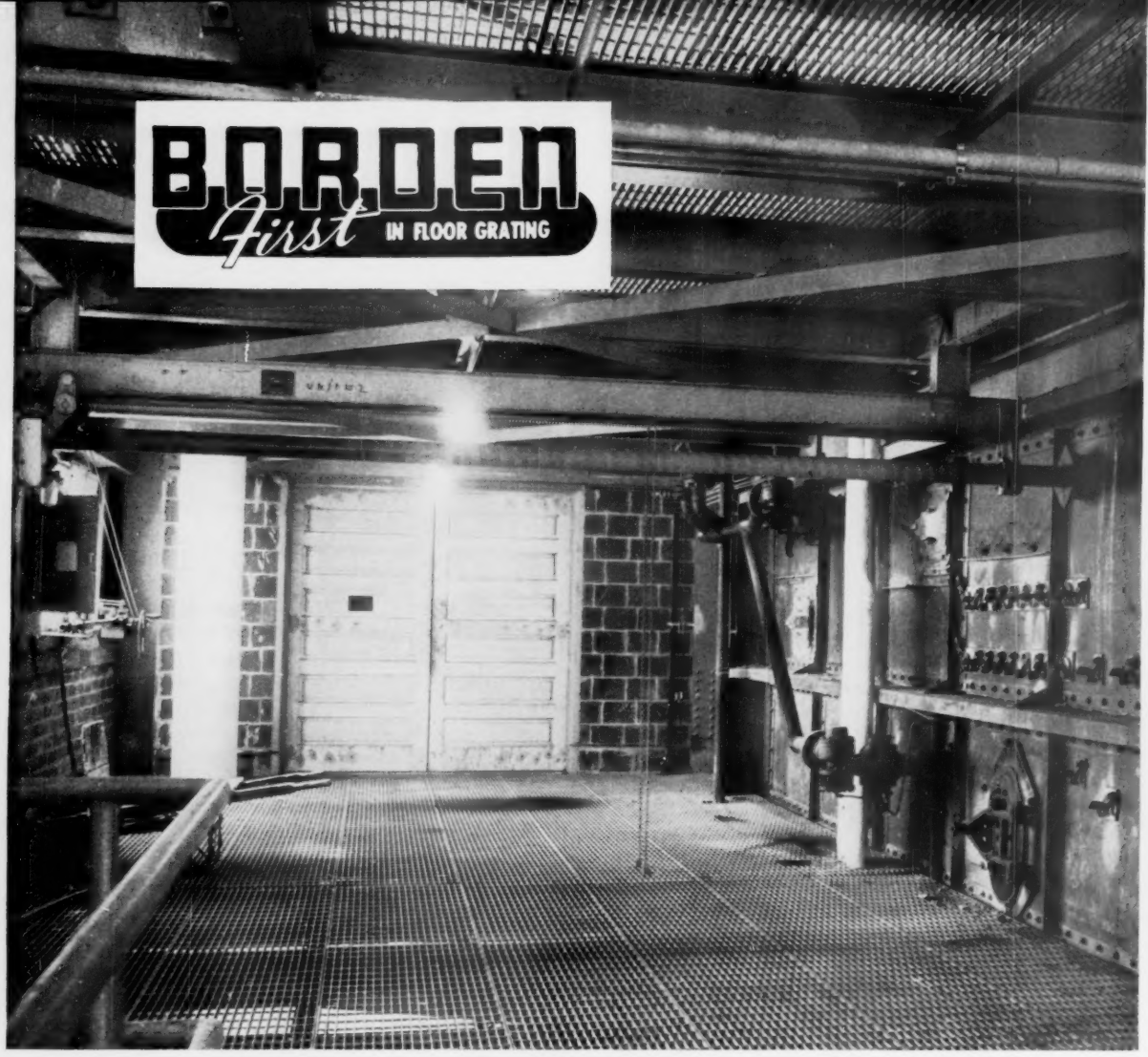
Mr. Fisher

The appointments of **Arthur H. Williams** as director of research and development and **Robert F. Hunter** as chief engineer of its Shafer Bearing Division, Downers Grove, Ill., have been announced by **Chain Belt Company** . . . **C. A. Liming** has been promoted to the position of marketing manager-power capacitors for **Federal Pacific Electric Company,** Newark, N.J. . . . **Robert S. Lundgren** has joined **Pacific Moulded Products Company,** Los Angeles, Calif., as chief engineer . . . **John F. Ring** has been named a gas engineer in the Consulting Engineering Department of **Ebasco Services Incorporated,** New York, N.Y. . . . **Joseph A. Rosenthal,** president of **Engineers Incorporated,** Newark, N.J., has announced the appointment of **Herbert O. Hartdegen** as assistant to the vice president dealing with contract administration and client relations . . . The appointment of **Francis X. Buschman** as director of research, development and engineering of **Hitemp Wires, Inc.,** Westbury, N.Y., has been announced . . . **Robert V. Mourer** has been named district service engineer for the Denver sales district of **The Babcock & Wilcox Company's** Boiler Division, according to **E. A. Kazmierski,** manager of field engineering.

Mr. Lundgren

John T. Reinhard is president of a new firm called **Hydro Mat Linings, Inc.,** Ann Arbor, Mich. . . . **CRS Industries, Inc.,** Philadelphia, Pa., has announced the appointment of **George Maleno, Jr.,** as project engineer . . . The election of **Dr. Guy T. McBride, Jr.,** as vice president of **Texas Gulf Sulphur Company,** New York, N.Y., has been announced . . . The promotion of **Alfred W. Andrews, Jr.,** to associate director of engineering for **Monsanto Chemical Company's** Plastics Division, Springfield, Mass., has been announced . . . **J. F. Camellerie** has resigned as vice president of **Plummer Associates** in order to establish a consulting practice of his own. His office is located in Huntington, N.Y. . . . The appointment of **Joseph R. Lewis** as director of engineering for the Sierra Electronic Division of **Philco Corporation,** Menlo Park, Calif., has been announced . . . **Walter F. Oleksiak** has been elected vice president-construction of **United Engineers & Constructors Inc.,** Philadelphia, Pa. . . . **Robert Bredson, James H. O'Neal, Robert O. Robertson,** and **John D. Tackett** have been appointed project engineers in the Manufacturing Department of **Amoco Chemicals Corporation,** Chicago, Ill.

Mr. McBride



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(Circle 8 in Readers' Service Dept.)

A Revolution in American Life . . .

Our SUPER Cities and Their Problems

• A STAFF REPORT •

Air pollution is one of the biggest problems facing the nation's growing metropolitan centers. Here smog blankets downtown Los Angeles.

A REVOLUTION, propelled on rubber-tired wheels, is rolling across the nation.

Bombs, guns and bayonets have no part in this upheaval, but its by-products — pollution, clogged transportation and slums — are about as deadly. The problem is quickly becoming recognized as one of the biggest domestic challenges of the second half of the twentieth century.

As Luther Gulick, president of the Institute of Public Administration and an urban specialist, puts it: "We have exploded into a new era in America, characterized by a new pattern of settlement, the vast sprawling metropolis."

The revolutionary aspects of the urban movement come alive even in the cold figures of the Census Bureau. Today, more than 100 million persons—more than two-thirds of our total population—live in urban areas. At the turn of the century only 24.1 million were in metropolitan communities. In the next quarter of a century the nation's population is expected to rise by 100 million with virtually all of this increase going into the cities, leaving only twenty per cent of the population in rural areas.

In the wake of this urban movement, giant, sprawling metropolitan centers have arisen with their myriad of suburbs spreading out in all directions. They are, in effect, creating "super cities" which sprawl across dozens of different governmental jurisdictions. They are super cities with super problems.

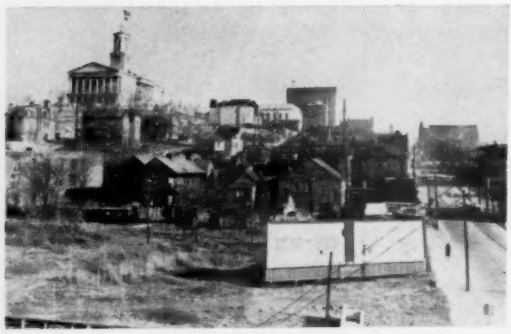
Traffic congestion, air pollution, water pollution, overcrowded schools, slums, and inadequate recreational facilities are just a few of the problems which have either been created or worsened by the rise of these super population centers.

The sprawl of these metropolitan areas has tremendously accentuated the inadequacies of the nation's urban transportation system. The automobile, rather than easing the problem, has greatly contributed to it.

A Washington, D. C., organization, the Institute of Urbiculture, has followed urban problems closely in recent years and provides this summary of present transportation headaches:

"Perhaps no other phase of urbiculture poses a problem so vital as that of transportation within the urbanized areas. Flight of residents to the suburbs along with the increased use of the automobile has rendered downtown streets and parking facilities incapable of handling the traffic. Consequently, many downtown residential areas have withered into slums, and many retail businesses have followed the centrifugal movement of their markets. Super freeways, one-way streets, parking lofts and other devices have been used as remedies, but have made little appreciable

The Nashville Story . . .



These "before and after" photographs taken on Capitol Hill in Nashville, Tenn., illustrate what can be done to improve downtown areas in urban centers. Urban renewal programs sponsored jointly by Federal and local governments have worked wonders in many of the nation's older cities. But many city planners believe an over-all coordinated approach is needed to meet the complex needs of urban areas.

headway. While slum areas have increased the demand for city services, reduced patronage of downtown businesses has reduced general tax-paying potential and a series of urban problems, including increased crime, have ensued. Suburbs, faced with the prospect of providing new facilities, have been similarly encumbered costwise; and the congestion which spawned their origin has followed to plague them.

"Although gregarious by nature, man does not want congestion if he can avoid it. The automobile has given him the means of pushing farther in flight, yet to remain accessible to the benefits of the city. This has given rise to a transportation problem of linking them suitably with one another."

Los Angeles probably provides the classic example of what can happen in an extreme case of urban sprawl. This huge California metropolis was referred to recently as a "jellylike glob of humanity oozing through a sea of smog on creaking wheels."

The city sprawls unevenly over more than 4,900 square miles of Los Angeles and Orange Counties, an area roughly equivalent to the size of the State of Connecticut. Its rapid spread into suburban groupings has left its old transit lines an ineffective means with which to move population to and from work. Today, Los Angeles is dependent upon the automobile. Indeed, it is almost a captive of the rubber-tired vehicles.

Los Angeles County, alone, has 2.9 million vehicles, 600,000 more than are registered in the entire State of Florida. In an attempt to keep this mass of automobiles moving, Los Angeles has poured millions of dollars into freeways and expressways, but the traffic keeps increasing. By 1980, the city is expected to have 900 miles of freeways and another 300 miles of expressways.

Writing in *The New York Times*, Harrison Salisbury described downtown Los Angeles as resembling a "Swiss cheese tunneled at the core and gnawed at the edges." About twenty-nine per cent of the 3,300 acres of downtown Los Angeles is occupied by streets, freeways and service ways with another thirty-eight per cent more occupied by off-street parking garages, loading facilities and other businesses related to the automobile.

Has this asphalt and concrete maze solved Los Angeles' problem? Just about any Los Angeles County commuter would come up with a quick and loud "no." After com-

pleting his survey of the situation, Salisbury concluded that a horse and buggy could cross Los Angeles almost as fast in 1900 as an automobile can make the trip at the 5 p.m. rush hour today.

Los Angeles' problems are extreme, but they are by no means isolated. Other urban areas of the nation are facing similar difficulties, some of which are nearing the crises stage. Metropolitan areas along the East Coast are an example. Some planners see a solid urban mass extending from New York to Washington, D. C., within a few years. The problems such an urban concentration would present are staggering.

Smog, or air pollution, has provided material for California comedians, but the situation is no joking matter for the city's engineers. Los Angeles maintains a staff of nearly 500 persons in its pollution control and spends more than $3.6 million annually in the fight. Already other cities like Washington, D. C., and New York City have realized that smog and air pollution is not unique to Southern California.

Transportation difficulties and air pollution, while serious, are only part of the immense problem that has been dumped on the nation by urban sprawl. The problem of providing schools, water, sanitation and recreational facilities are multiplied by the spread of the cities. The flight to the suburbs has heightened the decay of downtown areas, already choked by the overburdened transportation facilities.

Urban planners have been encouraged in recent months by what appears to be increased public and governmental interest in these problems. Significantly, both major political parties last month adopted platform planks recognizing the plight of the nation's urban areas and calling for renewed action in finding solutions. There are strong indications that urban areas may at long last get the same type of attention which rural agricultural areas received earlier in the century. The attack on urban problems could well provide a tremendous employment opportunity for professional engineers, not to mention the variety of complex social challenges.

Urban problems, of course, have by no means been completely ignored in the past. Certainly the program operated by the Urban Renewal Administration has been a boon to hard-pressed cities. Despite its limited scope, the Federal efforts toward urban renewal have spurred some truly amazing face lifting in areas once abandoned as impossible slum areas. The Urban Renewal Administration in Washington estimates that at least five local dollars have gone into projects for every one dollar allocated in Federal funds.

URA is by no means the only Federal agency dealing with urban problems. The Bureau of Public Roads, the Public Health Department, the Department of Commerce, and others have some phase of their activities tied up in the metropolitan areas.

This diffusion of action and authority worries some urban specialists who believe the problem, if it is to be solved, must be attacked on a broad over-all basis. A new residential development requires school facilities, water facilities, highways, and transportation. These problems must be met with an over-all plan, not by piecemeal individual plans, the experts argue.

Morton Wohl, assistant professor of transportation engineering at MIT, stresses this need for coordination in transportation planning in advance of large construction or reconstruction projects in urban areas. "Communities and planning agencies often fail to consider whether or not people and goods can move efficiently until after a project or building is constructed. As a consequence, the building or urban center frequently

Norfolk Before and After . . .

Narrow streets combined with a growing automobile population have created major traffic headaches in nearly all cities. These photographs show improvements in Norfolk, Va.

Progress At Spring Garden . . .

Renewal projects are reclaiming many city residential areas. Shown at the left is the Spring Garden Public Housing project in Philadelphia which replaced

areas like those in the photograph at the right. Urban specialists claim hundreds of other projects are needed throughout the country.

is unable to perform its intended function satisfactorily."

In Congress there is a great deal of agitation for the creation of a full Cabinet-level department which would coordinate and direct Federal urban activities. In support of the proposal, supporters point to the fact that the rural areas of the nation, which now represent a distinct minority of the population, are fully represented by a Department of Agriculture. Certainly urban problems, they contend, are now as severe and complex as those of agriculture.

As early as 1938, President Roosevelt urged that the government considered the growing urban problems. In 1942, Charles E. Merriam called for a Department of Urbanism within the Federal Government during a conference at Harvard University. Eight years ago, the National Housing Conference recommended the establishment of a Department of Housing and Urban Development. In subsequent years, this recommendation has been supported by the American Municipal Association, representing more than 12,000 cities, the AFL-CIO, the U. S. Conference of Mayors, representing 315 cities, the National Association of Home Builders, the National Association and Redevelopment Officials and the Society of Planning Officials.

Charles A. Blessing, president of the American Institute of Planners, representing 2,500 members actively engaged in urban planning, wholeheartedly endorsed the principle of a Cabinet-level department:

". . . the coordination of Federal aids to urban areas is one of the most pressing problems of our time. For this reason we urge the establishment of a Federal Department of Urban Development and Housing as a major means for securing first the coordination of Federal programs of aid to local government, and, second, a Federal agency to which urban areas can look for assistance in securing the maximum benefit from aid programs. As we have already noted, our cities and urban areas now account for two-thirds or more of our national population and most of our productive enterprises. Farm areas, the West, business and labor have long been represented in the National Cabinet by agencies which serve to coordinate the various interests of the Federal Government as they affect these special areas and subjects. Our cities urgently need a similar coordinating and representing department in the Federal Government for the most important of our national interests, those which are vested in cities. . . ."

Whatever the shape of future urban planning in the nation, there are many who believe it is imperative that the professional engineer be in the forefront. Speaking at a panel discussion during the NSPE meeting in Boston, Dr. Cyril Herrman, vice president of Arthur D. Little Company, emphasized the need for engineer participation.

"Too little communication exists between the city planner and the professional engineer . . . the processes of urban renewal in effect today present a challenging opportunity for the engineer to be in on the planning stage as part of the team . . .," he said.—**End.**

The Engineer at Work

FROM WASHINGTON

BY
MILTON F. LUNCH,
N.S.P.E.'s Legislative Counsel

Unusual Legislative Sessions Forthcoming

The Senate returns to work on August 8, with the House following a week later. This surely will be one of the most unusual legislative sessions in history, with the rival candidates for President (and possibly both candidates for Vice President) facing each other in the Senate chamber. Whether justified or not, every maneuver will be suspect as being motivated by purely political considerations as a prelude to the "official" opening of the campaign on Labor Day.

As a result of this unique political atmosphere following the party conventions, the outlook for pending legislation has taken on a different complexion. With regard to legislation of particular interest to the engineering profession, the following appears to be the present picture:

HIGHER EDUCATION—It is very likely that both parties will want to show a legislative record in doing something about the problems of students and institutions. Senator James E. Murray of Montana, chairman of the Senate Education Subcommittee, has indicated that a bipartisan approach might include:

- A loan program for students based on a Government guarantee for private loans from banks.
- A $115 million grant program for the construction of new buildings at private and public colleges. Fifteen million would be allocated for junior colleges.
- A $100 milion grant program for construction of medical and dental teaching facilities.
- Two-and-a-half million for state-wide inventories of existing and needed college facilities, and $250 million in loans to help colleges house the swell of students expected in the near future.

By 1964, Senator Murray stated, "an additional one million students will be knocking at the doors of our institutions of higher learning. If we are to provide . . . for these students, action must be taken this year. If action is not taken this session, we run the risk of losing an entire year."

SELF-EMPLOYED RETIREMENT—This is the "pending business" before the Senate, but it may be shunted aside temporarily in favor of other bills. A small group of Senators have announced that they are going to debate the bill at length and this could be the most formidable handicap to its passage in view of the press of other urgent legislation. The result may be determined by the attitude of Majortiy Leader-Vice Presidential Nominee Lyndon Johnson, who indicated that he favors the bill by calling it up for action before the recess. The opponents have introduced a large number of amendments, some of which would make it so costly that it would almost certainly be defeated or vetoed.

One of the most vociferous opponents, Senator Long of Louisiana, has offered a compromise which Senator Smathers of Florida, Senate sponsor of the bill, has indicated may be acceptable. The Long amendment would allow the self-employed person to deduct from taxable income one-half of the amount of his retirement deposit on the theory that this is the benefit now available to employees—the employee does not have to pay taxes on the contribution of the employer, but cannot deduct his share. He would retain the $2,500 limit on the annual retirement deposit, or fifteen per cent (instead of ten per cent), whichever is less. The net effect would be

to reduce the $2,500 limit to $1,250, compared to an original proposed limit of $5,000. Senator Long contends that his amendment will reduce the revenue loss to $100 million, compared to the Treasury estimate of the revised bill at $150-$250 million.

COMMON SITUS PICKETING—When Congress quit for the conventions the so-called "common situs" picketing bill was considered a dead issue for this session. The bill would give the building trades unions a special exemption from the secondary boycott provisions of the national labor law and allow them to picket and shut down an entire construction project even though the union's dispute was with only a single contractor or subcontractor. NSPE had objected to the bill because it could jeopardize the rights of engineering and surveying employees in the construction industry. There is much speculation now, however, that the bill may have received a new lease on life at one or both of the conventions in order to placate the labor unions. Whether there is any basis for these rumors remains to be seen, but if the bill is suddenly pushed by the leadership it may reasonably be assumed that there were "understandings" between the AFL-CIO hierarchy and certain candidates for high office.

Point Four Program of Vital Concern To Engineering Grads

The Mutual Security Act of 1960 contains an interesting innovation which may lead to an area of important concern for engineering graduates—a Point Four Youth Corps. The bill stops short of establishing such a group, but it does authorize the President to arrange for a nongovernmental research group, university or foundation to study the advisability and practicability of such a program under which young persons would be trained and serve abroad in programs of technical cooperation. The act authorizes up to $10,000 for the study. Representative Henry S. Reuss of Wisconsin has been an ardent advocate of the Point Four Youth Corps and is responsible for the study authorization. He contemplates that the new organization would operate abroad by teaching natives of underdeveloped countries modern techniques in farming methods, health and sanitation, education, etc. The plan would rely upon volunteers from college graduates who would serve a two-year tour of duty, following additional specialized instruction in the language of the country in which they would serve.

Gathering of Scientific Information Poorly Done, Says Committee

A comprehensive report by the Senate Committee on Government Operations on documentation, indexing, and retrieval of scientific information suggests that only a few agencies are placing sufficient emphasis on the subject. The staff study particularly deals with plans to use mechanized systems for assembling, translating, and disseminating scientific information. According to the report, Federal agencies are doing a hodge-podge job compared to the Russian operation which has a single agency with a staff of 3000 combing scientific papers from many countries for information of value to Soviet engineers, scientists and technicians. The report also found "a serious lack of coordination and direction by the National Science Foundation on whom reliance has been placed for leadership in all civilian science fields." The NSF, on the other hand, replies to the criticism that it believes it better to cooperate with scientific information services provided by societies and institutions rather than undertake direct Federal operation of similar services.

AEC Says Labs to Play Paramount Role

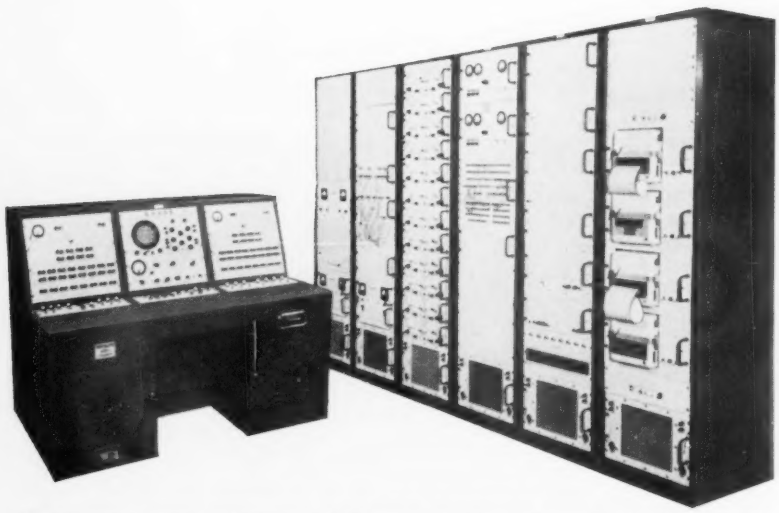
The Atomic Energy Commission has advised a joint congressional body that its own laboratories will continue to play the paramount role in atomic research in the next ten years. But "increased responsibility will continue to be placed on industrial organizations as they acquire facilities and capabilities," the AEC added. Senator Clinton P. Anderson of New Mexico, chairman of the Senate-House Atomic Energy Committee, welcomed the report as a clarification of the role of AEC laboratories, but there have been and will continue to be opposing pressures—some scientists are concerned that the role of the laboratories might be reduced, and some companies active in atomic work are pressing for a larger share of the Government's research work in this field.

Industry's Role in Federal Research And Development

By
ROBERT B. CHAPMAN, P.E.

Executive Vice President, Aircraft Armaments, Inc.
Cockeysville, Maryland

A Thorough Examination of this Vital Area and the Important Part which Professional Engineers Play in It. The Canons of Ethics and Rules of Professional Conduct Come under Critical Observation.

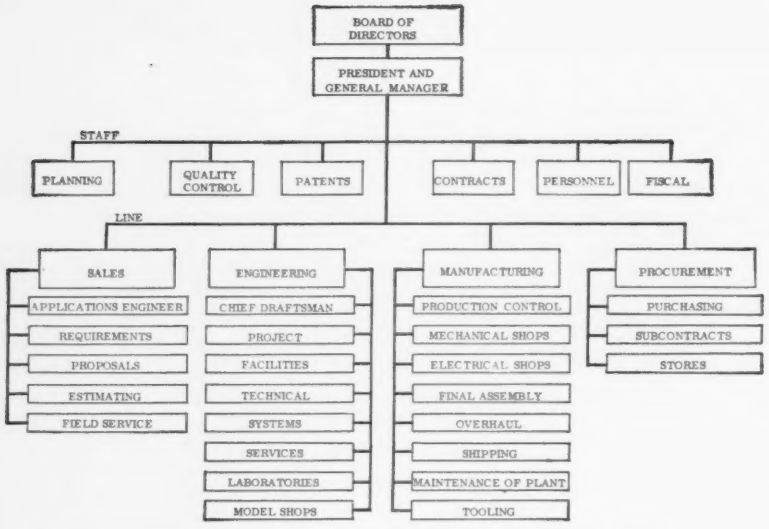


Titan nose cone telemetry check-out equipment—a typical electronic project in Federal R&D.

THE purpose of this presentation is to acquaint the reader with the work, organization, and methods of the industry which performs research and development under contract for the Federal Government. It is also proposed to examine the relation of these methods, which are imposed upon industry by Federal legislation and regulations, to the Canons of Ethics and Rules of Professional Conduct of the NSPE.

First and foremost, it should be emphasized that the single most important capability which a company must have, to work in this area, is "engineering." This is so important that a large proportion of the managers of this industry receive their basic training and initial working experience in some branch of engineering. The products are diverse and complex, including tanks, ships, missiles, aircraft, guns, ammunition, communication and navigation systems, simulators and trainers, and many others too numerous to recite. The basic techniques involved include mechanical, electrical, structural, aerodynamic, hydrodynamic, thermodynamic, electronic, electromechanical, explosive, propulsion, and automotive engineering. There is nothing routine or standardized about the engineering involved. Most frequently, the engineer is required to "push the state of the art" to obtain unheard of performance in terms of strength, speed, environment, etc. Consequently, a substantial percentage of the engineers in the research and development industry have advanced degrees or the equivalent in years of experience. The ratio of engineers to manufacturing personnel varies from one-to-one up to one-to-twenty.

Since this industry serves the national interest and consequently exists on public funds, the primary emphases of the Federal legislation which establishes the procurement system are (1) the selection of the firm which will perform the engineering and manufacturing by competitive process, and (2) the detailed and exhaustive surveillance by the Government of every detail of the company operation, including salaries, finances, quality, administration, and engineering,



Basic organizational elements of industrial contractors.

to make certain that public funds are not misused.

Because of the complexity of the equipment, the program (for systems, sub-systems and components) generally includes, (1) engineering study, (2) applied research, (3) development, (4) prototype fabrication, (5) test and evaluation, (6) product engineering, (7) production engineering, (8) production, and (9) field service. The procuring agencies and using Government services have decided that this program proceeds most smoothly when a single contractor performs all of the work from phase (1) through phase (9). Consequently, they generally require that the contractor possess a production engineering and a manufacturing competence which will permit him to produce and service at least the initial quantities of any equipment he develops.

It is increasingly the practice for the Government to issue contracts for entire programs, even though the contractor may not be able to accomplish all of the engineering and manufacturing involved. As a consequence, each contractor must set up an organization capable of procuring subcontract engineering and manufacturing services varying between one-third and two-thirds of the dollar value of the basic program. This procurement must be accomplished in the same fashion as the original procurement was accomplished by the Government agency, and must include all the elements of competition economic consideration of small business in distressed areas, retention of royalty free rights to the Government, and other similar aspects. This procuring function is an essential responsibility of any size R&D contractor.

In this area of Federal research and development, it is very difficult for Government operating and procuring agencies to decide and specify exactly what they want. In the case of the more complex weapons, they are not in a position to specify what they desire without first being told by industry what is possible. As a consequence, industry is constantly working without any contract on studies, research, and experimentation, the results of which is then made known to the Government with the hope that it will result in a contract from the Government.

In order to comply with Federal statutes and the implementing regulations of the armed services, all industrial contractors operating in this area have the basic organizational elements shown in the chart on this page. This is true regardless of the size of the contractor. It may be that the functions are arranged differently or are combined under one person with a different title, but all of these functions must be provided. Within the supervising Government agency there is an "opposite number" for each function who inspects and monitors the activities of the contractor's personnel assigned to perform this function.

The functions of the organizational divisions shown in the chart are as follows:

Board of Directors—Establishes policy, elects and appoints officers.

President and General Manager—Implements policy and directs all operations.

Staff Divisions:

Planning—Cash, personnel, and facility forecasts.

Quality Control—Receiving, in-process, and shipping inspection.

Patents—Performs the necessary patent search, preparation of patent applications, and prosecution of patent acquisition.

Contracts—Negotiation and administration.

Personnel—Hiring, administration, policy, security, insurance.

Fiscal—Accounting, billing and collections, property records.

Operating Divisions (Sales):

Applications Engineering—contacts potential customer engineers and buyers to obtain bid opportunities.

Requirements – Investigates long range trends and advises Engineering and Manufacturing as to desired personnel and facilities.

Proposals—Supervises Engineering and Manufacturing in the preparation of proposals.

Estimating—Works with all company personnel to present detail cost data in desired customers' form for bid competitions. Maintains past cost experience records for comparison purposes.

Field Services—Contacts customers to insure that delivered equipment is functioning properly. Sells engineering and manufacturing services for spares, maintenance, and repairs.

Engineering:

Chief Draftsman—Prescribes standard processes and procedures, and monitors all company drafting personnel to make certain these procedures are followed.

Project—Coordinates and directs all company personnel in carrying out work under contract.

Facilities—Obtains and assigns engineering facilities.

Technical – Applies engineers to the technical problems of each project. Trains engineers. Reduces technical information to standard drawings.

Systems – Coordinates the various technical groups. Performs special studies and directs work in the field of operational analysis, human engineering, reliability, producibility, etc.

Services – Provides photographs, technical writing, reproduction, art and other supporting services related to engineering documentation.

Laboratories – Development and testing.

Model Shops – Fabrication of experimental parts.

Manufacturing:

Production Control—Plans and controls the flow of manufacturing work.

Mechanical Shops—Accomplishes mechanical manufacturing including machining, turning, welding, etc.

Electrical Shops – Accomplishes the assembly and wiring of electronic components on mechanical parts furnished by the Mechanical Shop.

Final Assembly—Assembles component parts provided by other shops.

Overhaul—Provides post-contract services on delivered products.

Shipping—Arranges for shipment of partially completed parts to subcontractors and vendors for processing, and of finally completed products to the customers.

Plant Maintenance—Maintains the equipment and facilities.

Tooling – Engineers and manufactures special tools.

Procurement:

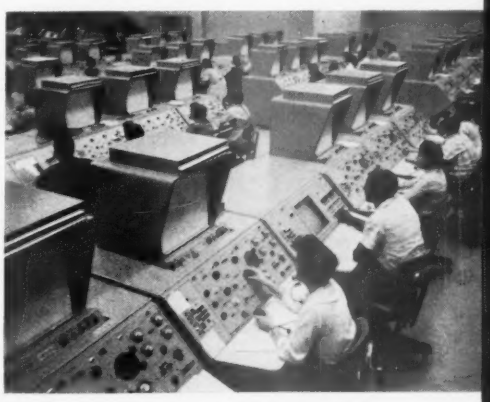
Purchasing—Purchases raw materials and components.

Subcontracts—Procures engineering and manufacturing services from other contractors to specifications prepared by Engineering.

Stores—Maintains control of all raw materials, components, in-process subassemblies.

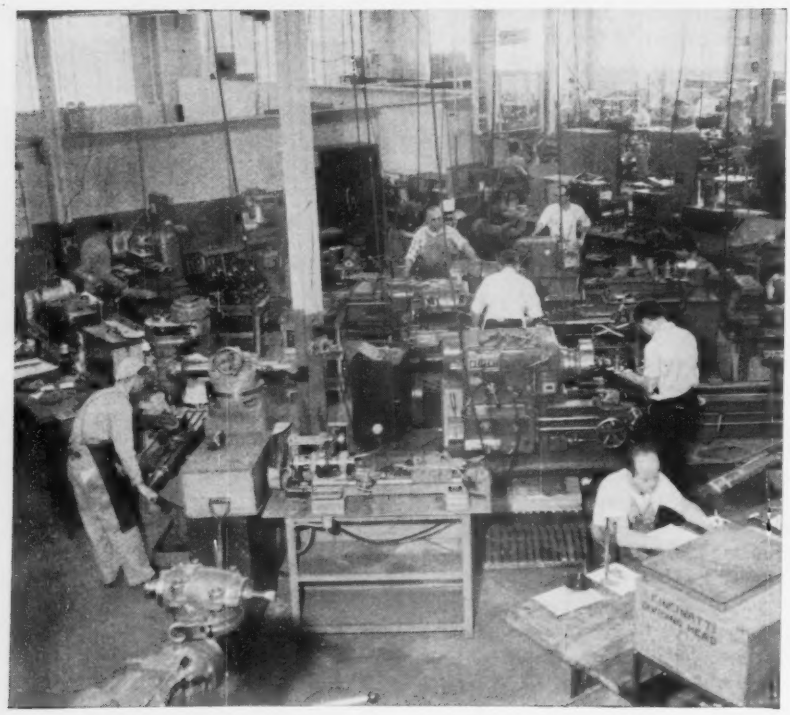
As indicated earlier, engineers are extremely important in the Federal research and development industry. Almost all of the functions of Engineering and Sales are normally supervised by graduate engineers who have the necessary qualifications for registration. Frequently the president and general manager is also a graduate engineer. Patents and Contracts people usually have an engineering education in addition to their legal education. Some of the functions of Manufacturing, particularly Tool Engineering and Production Control, utilize engineers as supervisors. Project Management, whether an integral part of the Engineer-

The T-92 light tank above is but one of many diverse products developed by industry for the Government. Among other products are ships, missiles, aircraft, guns, ammunition, communication and navigation systems, simulators, and trainers.



Above: Complex instruments such as the Federal Aviation Agency flight simulator come under the heading of electromechanical projects. There is nothing routine or standardized about the engineering involved in producing such an apparatus, says the author. Many engineers engaged in the research and development industry have advanced degrees or the equivalent in years of experience. **Left:** The Engineering Department, like this one at Aircraft Armaments, is the most important group concerned with Federal R&D.

Mechanical Manufacturing Facility . . .



Electronic Manufacturing Facility . . .

ing Division or set out separately in an operations type organization, is generally performed by graduate engineers.

In order to show how the organization just described will function in the Federal research and development program, let us consider a typical and general case history.

The XYZ company has been performing research and development and manufacturing for the Federal Government for a number of years. It has under constant surveillance by members of its Requirements Department the budgets, the equipment needs, and all other pertinent data from all Government agencies in which it has an interest. It has learned that one of the three services, and specifically the Guided Missile Agency in one of the midwestern states, is considering the procurement of a universal testing device which will be applicable to a half-dozen different guided missiles.

The requirement is very difficult to fulfill. The missiles are of all sizes and shapes, and of many modes and environments of operation. They have been developed by a number of different prime weapons systems contractors, all of whom have been providing their own test equipment which is applicable only to their own missile, and which provides a substantial source of income to the prime weapons systems manufacturer. The Government agency is being resisted by all of these prime weapons systems contractors, and does not know even how to express its requirement, much less how to solve it. The agency makes known through oral contacts with sales engineering representatives and executives of a number of test equipment manufacturers that it is considering this requirement. Each of these test equipment manufacturers then reviews all of his existing equipment to see if any of it can be applied to the purpose of the universal tester. Those that have applicable equipment do the necessary engineering and prototype manufacturing at their own expense, and submit a sample for testing at no expense to the Gov-

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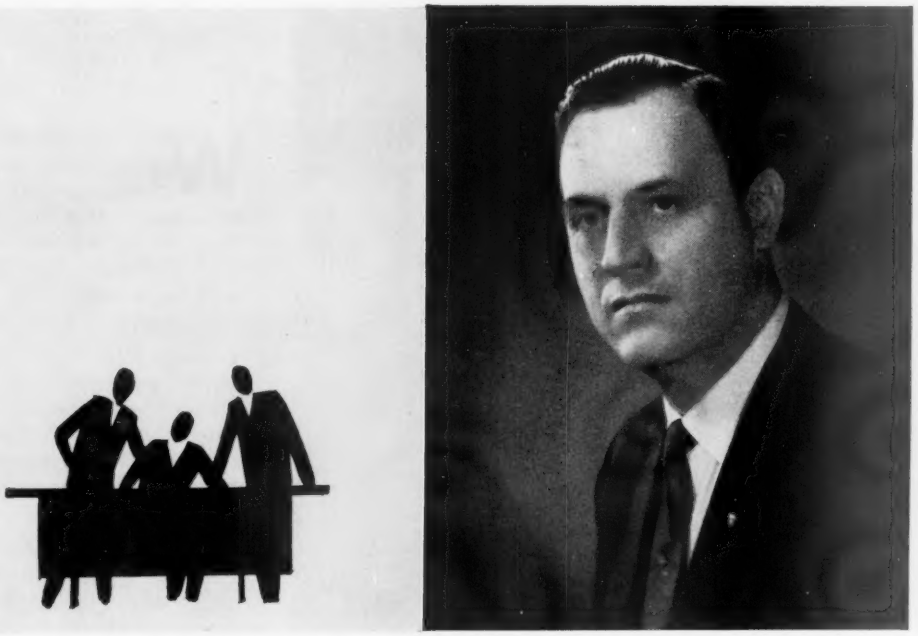
Professional Profiles



Here's a man—Leslie L. Appelt, of Houston, Texas—who took his engineering talents and entered the real estate business to find it a most successful venture.

According to Leslie L. Appelt, of Houston, Texas, he owes his success as a realtor, to a strong degree, to his slide rule. When big real estate transactions are pending or become realities, Mr. Appelt is usually in the middle of them.

Professionally, Mr. Appelt is an industrial and commercial realtor who has combined real estate know-how with engineering skill and knowledge. The combination has proved successful, as well as unique. He is the only registered professional engineer in Houston actively engaged in real estate.

Armed with a B.S. degree in engineering from Texas Agricultural and Mechanical College, and a combination of quantity-and-quality real estate experience, the 41-year-old realtor-engineer is changing the structural face of Houston and Harris County, Texas.

Prior to entering the real estate profession, Mr. Appelt headed a successful engineering firm. During this period, he had many opportunities to observe the vast potential in Houston real estate, so he switched careers.

One of his major transactions was negotiating for the purchase of a large lumber concern and its properties in sixteen cities for his friend, the late Robert E. Hornberger, Dallas millionaire. Reportedly, the purchase price was in excess of $3,000,000, and is recognized as one of the largest lumber property transfers of Texas in recent years.

With construction started on the $32,000,000, 44-story office building of the Humble Oil & Refining Company in downtown Houston, Mr. Appelt recalls when he and another prominent Houston realtor acted as trustees for the oil company in the purchase of a 2-block site. Because of the scarcity of vacant land and the rigid reluctance of owners to sell, the project required fourteen months. Humble had instructed that negotiations be kept confidential and the city's top secret was not known until approximately sixteen months later when it was officially announced by the press.

Realtor-Engineer Appelt is helping develop the 1100-acre San Jacinto Industrial District, and has completed the sale of many choice sites. He has assisted in land negotiations for many national, big-name firms, not only in Harris, but surrounding counties.

JETS Awar

WHEN an engineering-minded high school s
ville, Ohio, got interested in low tempe
few years ago, he could have had no i
bring him to Washington, D.C., in the summer o
tours of the National Bureau of Standards, th
Applied Physics Laboratory, and the Air Resea
ment Command.

The student is Greg Touchman, now 18. Hi
temperature work led him to design and build an
family's home workshop. The device was exhibi
annual JETS National Engineering Project Expos
State University in East Lansing last May. Gre
with his academic record and his participation i
ter program, led to his selection as the 1960 JET
Engineer.

The award included a four-day trip to Wash
by NSPE—for Greg and his JETS advisor, Miss Wi
teacher at the Cedarville High School. Richard T.
director of the JETS organization, accompanied

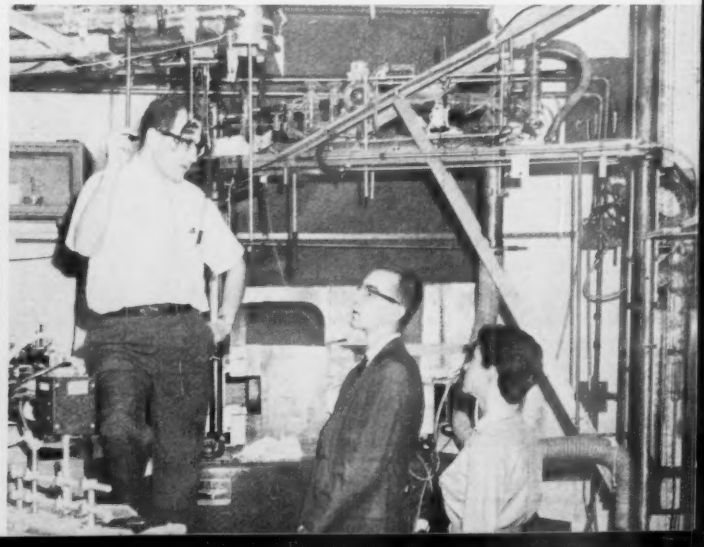
At the National Bureau of Standards, Greg h
scriptions of the low temperature liquefiers used in
research. The NBS tour also covered such thi
wave motion analysis, stress testing, and compari
the use of an interferometer.

A tour of the Air Research and Development
drews Air Force Base gave Greg and his adviso
something of the scope of the engineering ap
quired by our defense programs.

At the Johns Hopkins Applied Physics Labo
Miss Parr talked to engineers who are deeply in
tracking and instrumentation projects.—**End.**

Above: Greg Touchman, the 1960 JETS National Junior Engineer, exhibits his home built air liquefier at the eighth annual JETS National Engineering Project Exposition at Michigan State University. **Below:** Greg and his science advisor, Miss Wilma Parr, get a review of NSPE activities from Paul H. Robbins, NSPE executive director. Standing is R. T. Fallon, executive director of JETS.

Greg's interest in cryogenics made the low temperature research facilities of the National Bureau of Standards a highlight of his tour.



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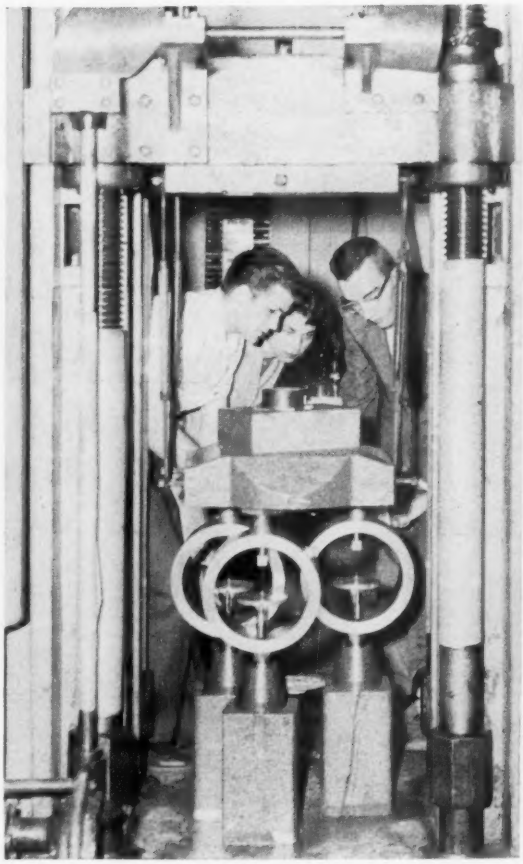
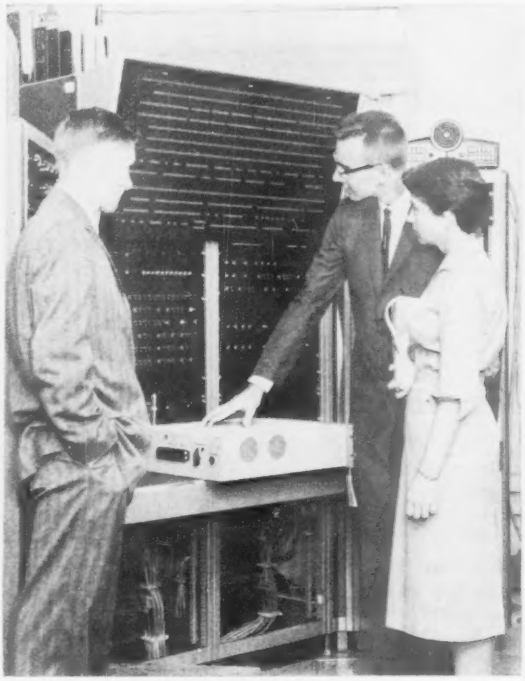


Left: A close-up of the workings of one of the large presses at NBS for structural testing. **Below:** An NBS guide shows Greg and Miss Parr the control panel of the newest electronic computer now under construction at the Bureau.



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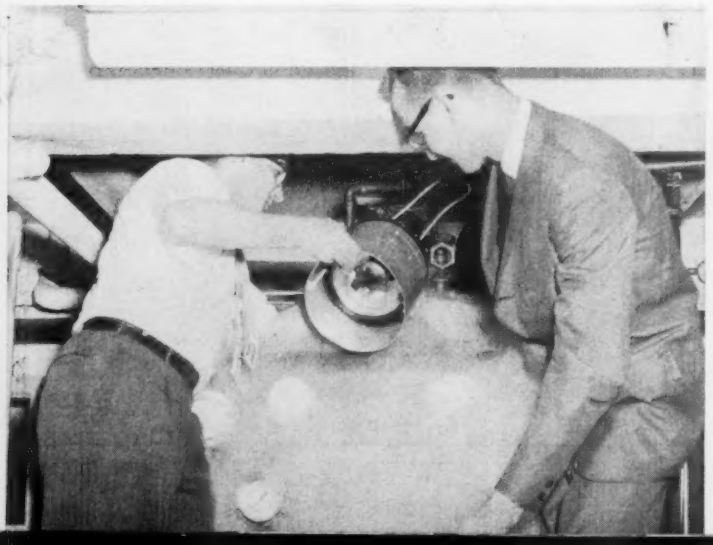
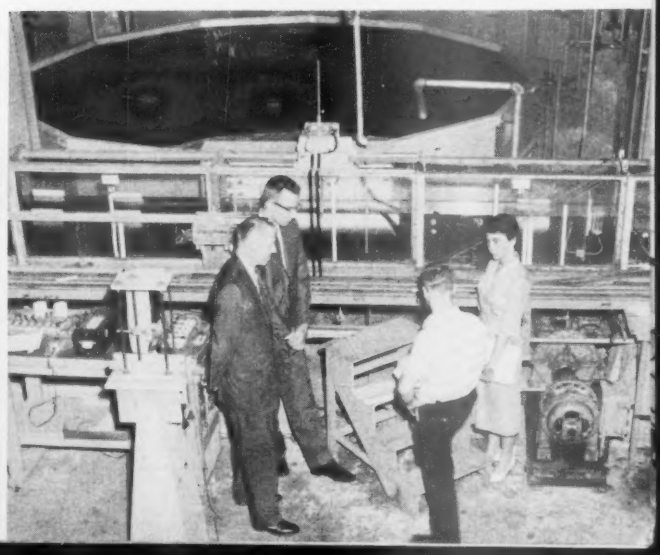
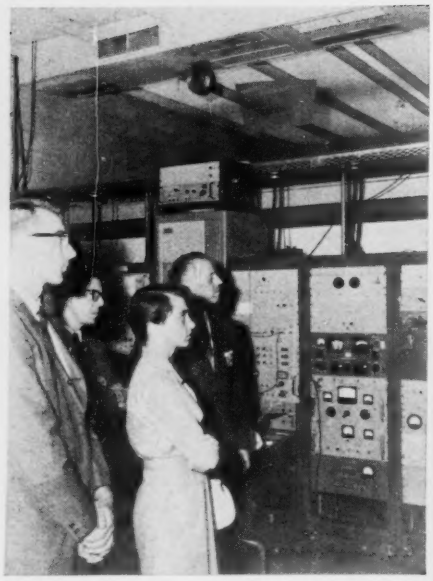
A cryogenics researcher at NBS pours liquid nitrogen into a compressor unit.



A large-scale research project involving the study of wave motion at NBS.





The control room for the Transit satellite tracking station at the Applied Physics Laboratory of the Johns Hopkins University near Washington.

An AE Photo Story

A Johns Hopkins researcher explains the operation of a high altitude test chamber.

Above: A model of the Transit navigational satellite is inspected by Greg and his science advisor at the Applied Physics Lab. **Below:** Watching the radar scopes in the Johns Hopkins guided missile battle simulator.

Report on a Case by the Board of Ethical Review

The Board of Ethical Review was established to provide service to the membership of the NSPE by rendering impartial opinions pertaining to the interpretation of adopted Canons of Ethics and Statements of Policy regarding professional conduct. The *American Engineer* will print findings on specific cases as they are reported by the BER to the NSPE Board of Directors.

Case Number 60-3

Subject:

Application of canons of ethics and rules of professional conduct to subprofessional services performed by professional engineer

Facts:

An engineering firm in which all the principals are professional engineers provides services on occasion of a type and nature regarded as subprofessional in character, although related to professional engineering services. The firm is invited to submit a written bid for work comprised solely of subprofessional services.

Question:

Do the provisions of the Canons of Ethics and Rules of Professional Conduct, apply in the case of such subprofessional services?

References:

Canons of Ethics, Section 2—". . . and he will avoid all conduct or practice likely to discredit or do injury to the dignity and honor of his profession." Section 19—"The engineer will endeavor to protect the engineering profession collectively and individually from misrepresentation and misunderstanding."

Discussion:

It is clear that the Canons of Ethics and Rules of Professional Conduct are intended to apply only to professional engineering practice, and not to business activities in which a professional engineer may engage, either as his sole activity or in conjunction with his engineering practice.

There are two basic situations in engineering practice relative to this discussion. Virtually all contracts for professional engineering services require some subprofessional and nonprofessional work to furnish the final professional result. This situation is not relative to the present case which relates only to those contracts which are solely of a subprofessional nature.

Sections 2 and 19 of the Canons limit the engineers' personal conduct in a general frame of reference to his professional work. Although the Canons do not apply to subprofessional and nonprofessional (business or commercial) activities, it becomes incumbent upon the engineer involved to be scrupulously careful to make clear to his clients and the public the distinction between the two categories of work. It is desirable where the subprofessional work is a large part of the firm's activities, to operate through a separate form of organization, with a distinct name. Where this is not practicable, and in the case of an operation in both categories by the same firm, the engineer should adopt other means to segregate the types of work, including references in the contract or in correspondence.

In applying the distinction noted above, it should be kept in mind that the prohibition against competitive bidding for professional services is based on protection of the public through avoidance of the sacrifice of quality to the lowest price. This principle is not applicable to subprofessional or nonprofessional services, and this difference permits competitive bidding for subprofessional or nonprofessional (business or commercial) services, which may be clearly and accurately specified.

Conclusion:

The provisions of the Canons and Rules do not apply to services solely of a subprofessional nature.

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Note: Member Gillespie did not participate in the consideration or decision of the above case.

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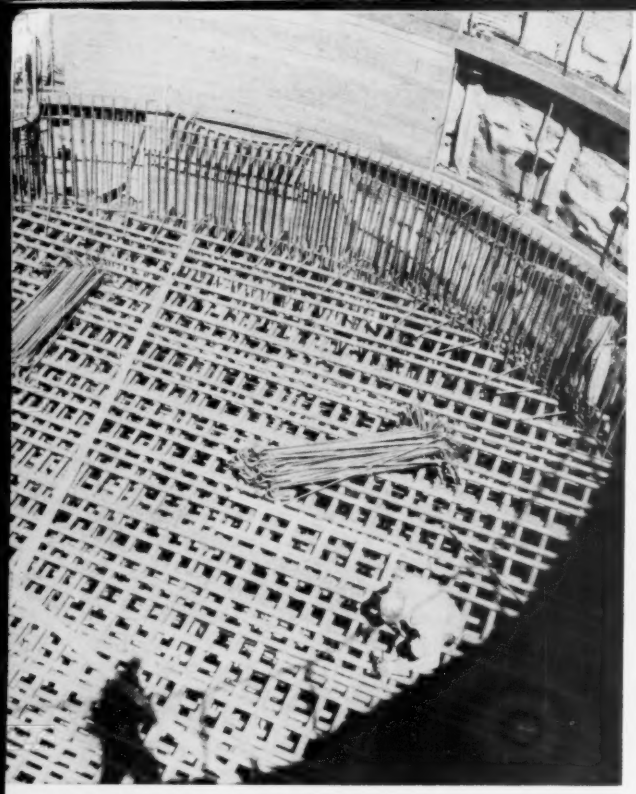
The Civil Engineer:



The civil engineer is busy designing launching pads, above, and retractable towers, below. He has even undertaken the planning of buildings for the surface of the moon. But such activities are peripheral to space engineering as well as to civil engineering.

ALL the glamor and publicity given to engineering achievements of the Space Age is making the profession increasingly prominent throughout the world—but what of the civil engineer? Is he the forgotten man of our time?

The official poster design for this year's observance of National Engineers' Week (in February) featured a striking photograph of the moon taken with the 100-inch Mount Wilson telescope. Emblazoned on the lunar poster was the Week's keynote theme, "Engineering's Great Challenge – The 1960's." The 1959 theme, "Engineering for the Age of Space," was displayed against an equally arresting photo of the Andromeda Galaxy glowing in the night sky.

The average civil engineer, who represents the largest single branch of National Engineers' Week's sponsoring organization, the National Society of Professional Engineers, dutifully displayed the moon on his office wall, his mail and his lapel, and otherwise participated in the space-oriented activities marking the tenth anniversary of the Week's observance. But like a tourist who has wandered into the Planetarium while looking for the subway, he is somewhat bewildered and dismayed.

He sees the mechanical, electrical, chemical, metallurgical and other specializing engineers happily joining the scientists on their highly publicized bandwagon into space, while he alone remains stolidly earthbound. True, he is busy designing launching pads and retractable towers. He has even undertaken the planning of buildings for the surface of the moon. But these activities are peripheral to space engineering as well as to civil engineering, the essence of which continues to be what it has always been—the design and construction of buildings, dams, bridges, canals, tunnels, roads, waterfront structures, water supply and sewerage disposal systems.

The Space Age's Forgotten Man?

Has He Been Stripped of All Glamor and Prestige?

By
SAMUEL C. FLORMAN, P.E.
Vice President, Kreisler-Borg Construction Co.
White Plains, N. Y.

These undertakings, which through familiarity have already begun to lose much of their glamor in the public eye, seem to become just a little bit more pedestrian with each new rocket launching, and the civil engineer has good reason to suspect that the chief accomplishments and glory of space age engineering will go to others.

This suspicion amounts to a certainty in the many engineering schools which are currently undergoing reorganization, veering sharply away from long-established curricula toward a new synthesis called "engineering science." Such time-honored courses as surveying and materials testing are now "out;" nuclear physics and electronic computors are definitely "in." And this new stress on scientific theory is accompanied by an alarming tendency in some engineering circles to regard the practicing civil engineer as little more than a technician well versed in the use of handbooks.

The number of freshman engineering students planning on a career in civil engineering has been dropping steadily and is now less than fourteen per cent of the total, while electrical and mechanical engineering aspirants have increased to more than fifty per cent. A recent Professional Engineers' Income and Salary Survey tells an equally depressing story. The $9,620 median income for civil engineers compares unfavorably with $10,250 for mechanical engineers, $10,270 for electrical engineers and $11,170 for chemical engineers.

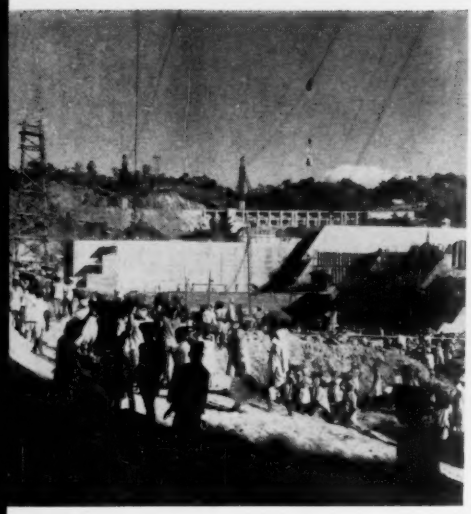
Low in income, short on glamor and decreasing in professional prestige, civil engineering seems well on its way to obscurity at the very moment when the engineering profession in general is reaching new heights of respectability and importance.

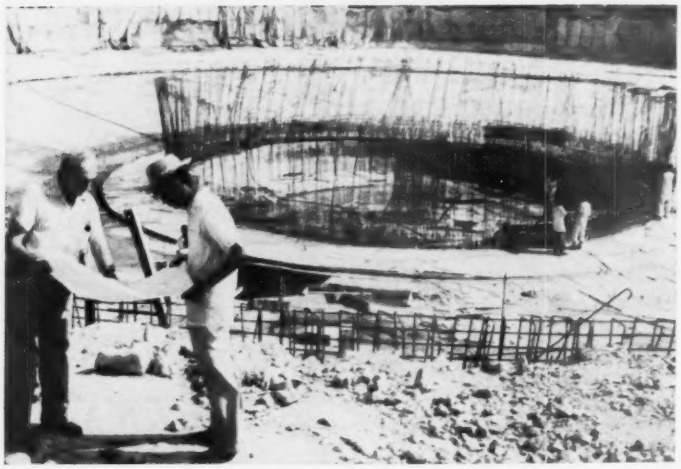
THIS is all the more distressing to the American civil engineer because not so many years ago he held a unique position in the national culture, universally admired as a creator and a pioneer. As the young nation grew he had come to be regarded as something of a folk hero, gallant and dashing in his high-laced boots and wide-brimmed hat. He scaled peaks of romantic glory in Zane Grey's popular *The U. P. Trail*, and novelist Harold Bell Wright proclaimed grandly in *The Winning of Barbara Worth* that "there can be found no finer body of men than our civil engineers." These words were given dramatic impact when Ronald Colman played the leading role in the movie of the same name.

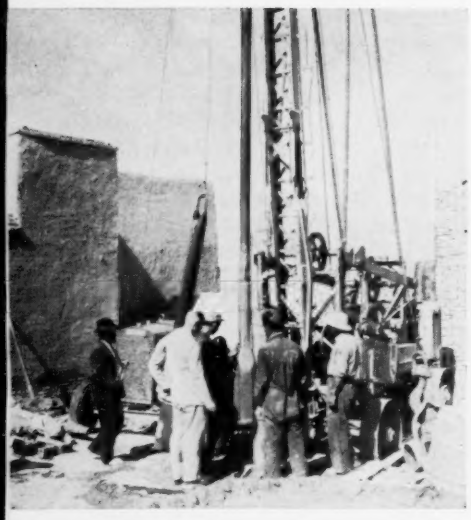
Indeed, throughout history civil engineers have been accustomed to esteem and recognition. Imhotep, designer and builder of the first great Egyptian pyramid, gained fame and power during his lifetime and was deified by later generations. Roman engineers were acclaimed by the populace and prized by emperors who recognized the

Throughout history civil engineers have been accustomed to esteem and recognition. Roman engineers, who designed the Coliseum below, were acclaimed by the populace and prized by emperors who recognized the importance of construction in the winning and stabilizing of empires.

Today, the civil engineer is still experimenting. He discovers new materials and is doing different things with familiar ones such as concrete—a product now being pumped, sprayed, vacuumed, precast and prestressed. Illustration below shows prestressed bridge beams ready for casting.







The civil engineer believes that respect and friendship are more likely to accrue to that nation which best assists the underdeveloped countries to achieve the goals which they have established for themselves right here on earth. For example, our International Cooperation Administration's technical assistance projects include, clockwise from upper left: the Rihand Dam in the state of Bihar, India; modernization of highways and bridge systems in Vietnam; Greater Karachi water supply and sewerage project, Pakistan; bridges in Afghanistan; more of the Karachi works, and irrigation projects in Iran.

The American Engineer

importance of roads and aqueducts in the winning and stabilizing of empire. The master craftsmen who built the medieval cathedrals, although not of high social rank, received the support of church and state, and maintained status through the establishment of respected guilds. The Renaissance saw the emergence of great artist-engineers, the most famous of whom, Leonardo da Vinci, served as military engineer in the court of Cesare Borgia. Vauban, builder of fortifications and public works for Louis XIV, and founder of France's *Corps des ingénieurs du Génie militaire*, was made marshal of France and, one hundred years after his death, was honored by Napoleon. John Smeaton, builder of the Eddystone lighthouse (and reportedly the first to call himself a "civil" engineer) was a respected member of the Royal Society of London, and Thomas Telford, builder of the Menai Suspension Bridge at Bangor, lies in Westminster Abbey along with John Rennie, constructor of famed Waterloo Bridge, and George Stephenson, England's first great railway engineer.

In each age the changing needs of civilization have kept the civil engineer very much in demand, and heretofore the progress of science has offered him, not competition, but increasingly satisfactory means of meeting the challenge. The work of the great mathematicians, Galileo, Newton, Leibniz, Hooke, Euler, and Bernoulli provided the foundation for the science of structural analysis, which was developed by the French engineers Coulomb and Navier in the late eighteenth and early nineteenth centuries. Shortly thereafter, the invention of structural steel and Portland Cement gave civil engineers materials worthy of their new theories, and the results have changed the face of the earth.

Now, on the threshold of a new era of even greater construction need and potential, with the underdeveloped nations of the earth clamoring for great deeds, the civil engineer is startled to find the world's attention diverted by the spectacle of flaming rockets and beeping satellites. He himself, wearing moon and galaxy emblems

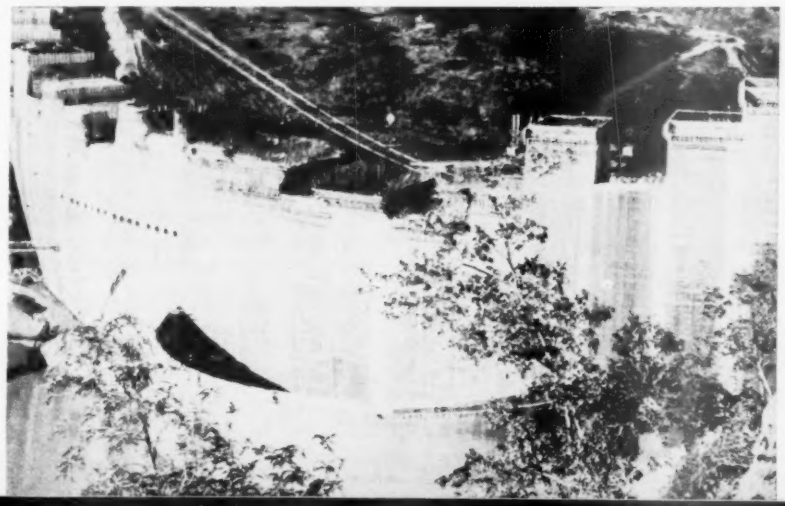
Always inherent in the design of structures is the imaginative and aesthetic consideration. This bridge over the Savannah River in Georgia received an award from the American Institute of Steel Construction for the beauty of "the lithe steel spans and the simple muscular piers."

on his lapel, and attending symposiums on "Sputnik and the Engineering Profession," is cast into a mood of uncertainty, and begins to wonder if perhaps in the mid-twentieth century science has suddenly passed him by. Are the physicists, chemists and "science" engineers destined to stampede over civil engineering as the social scientists have done to their mother discipline, philosophy?

It must be admitted that much of the theory of modern physics and engineering science is beyond the scope, and sometimes the comprehension of the civil engineer. The Institution of Civil Engineers of Great Britain, established in 1818, defined engineering as "the art of utilizing the forces of Nature for the use and convenience of man," and where such "use and convenience" are not immediately apparent the civil engineer is reluctant to venture. He has no quarrel with "pure" science and research; indeed, he is only too ready to adopt for his own purposes any and all new tools of science as they become available. He continues to expand the frontiers of structural analysis, hydraulics and soil mechanics through the use of advanced mathematical theory and with the aid, recently, of the most modern electronic computors. He is experimenting with new materials such as aluminum and the rarer metals, structural glass, plastics, resins, new petroleum and gypsum products, and is doing new things with familiar ones such as concrete, which is now being pumped, sprayed, vacuumed,

(Continued on page 50)

Although some peoples of the world may be enchanted by the beginnings of space exploration, those of many nations are committed to aims and programs much more immediate and in many ways no less exciting. On the River Zambezi, the Federation of Rhodesia and Nyasaland has just completed the Kariba Dam, shown below in the course of construction.



New Literature

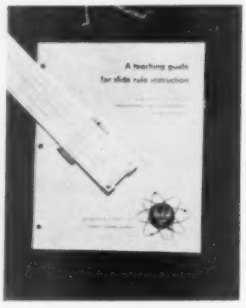
THREAD GUIDE—A new basic guide to screw thread technology—useful to equipment specifiers, engineers, and machine designers—has been published by The H. M. Harper Company. "Harper Thread Guide," a 16-page booklet illustrated throughout, offers a basic introduction to the varied types of threads. It briefly outlines the history of threads, defines the terminology used in industry and explains with diagrams the differences between the major kinds of screw threads. Several pages of charts detail the measurements, characteristics and capabilities of the standard thread types according to the Unified and American Thread Series, ASA B 1.1-1960. Additional charts describe the characteristics and other data of tapping screws and wood screws. A torque guide outlines the normal load values that may be applied to bolts of various metals. There is also a section about the wide range of precision threads made by The H. M. Harper Company.

(Circle 15 in Readers' Service Dept.)

TILE—Glazed and unglazed tile and brick for interior and exterior applications in a variety of industrial, commercial and residential installations are described and illustrated in the 1960 structural clay product brochure available from Natco Corporation. Ceramic glazed Vitritile—a structural facing product in twenty-one standard colors and nine accent colors—and many colored and textured facing bricks are highlighted in the 24-page, four-color catalog. The bricks include: "SCR," ceramic glazed velour textured, cerami glazed Vitribrick, and speckled ceramic glazed in Norman and standard sizes. Other products featured in the brochure are Tex Dri-Wall, patio, stairtread, modular Dri-Speedwall and unglazed facing, Uniwall facing, flashing, Speed-a-Backer, loadbearing and partition, drain, and Fireproofer tiles; glazed Segmentile; ceramic glazed window stool; Tri-Filter block underdrains; clay conduit, clay sewer pipe; wall coping; ceramic glazed handrail; ceramic glazed splayed base, and round and rectangular flue lining.

(Circle 16 in Readers' Service Dept.)

SLIDE RULE—A comprehensive guide to slide rule instruction is now obtainable by educators from Pickett & Eckel, Inc. Authored by Dr. Maurice L. Hartung, professor of the teaching of mathematics, the University of Chicago, the 48-page booklet, "A Teaching Guide for Slide Rule Instruction" is a complete treatise on the subject.



It is subdivided into twelve sections that can be applied to classroom use in their original order or as the teacher may see fit. Pickett has issued the new publication as part of their Educational Aids Program.

(Circle 17 in Readers' Service Dept.)

SEMICONDUCTORS—Amperex Electronic Corporation has announced the publication of their new condensed semiconductor catalog. This 12-page catalog includes basic specifications of the new line of VHF transistors manufactured by the recently perfected PADT (Post Alloy Diffusion) process for convertor, mixer and oscillator applications. The PADT process, which is thoroughly described in the catalog, is an automatic method utilizing "self-jigging" techniques to achieve maximum uniformity and extremely high yields. The catalog also contains a complete listing and specifications of a comprehensive line of germanium PNP and NPN audio (small and large signal), computer and switching (high and low speed) transistors. Also listed with specifications are the complete Amperex lines of germanium and silicon reference and power rectifier types, and photodiodes.

(Circle 18 in Readers' Service Dept.)

TESTING—The latest data on environmental testing and other applications for controlled atmospheric conditions is the subject of a new 32-page brochure (#600) offered by Webber Manufacturing Co., Inc. An outstanding feature is a pictorial color chart summarizing latest known data at altitudes from sea level up to two million feet. It shows specific weight, pressure, acceleration of gravity, and molecular weight at the various altitudes. Other charts give technical information on atmosphere, temperature and humidity. The brochure includes a review of the nine main environmental applications, and presents details on thirteen types of Webber environmental chambers and low temperature freezers. These provide a temperature range from minus 225 degrees F. to plus 1,000 degrees F., and simulate various conditions of altitude and humidity. In addition, the brochure includes data on temperature performance, specific heat of various substances, metal shrinkage, low temperature refrigerants, conversion fluids, temperature conversion, and temperature controls. Schematic diagrams and engineering data on Webber equipment are also given.

(Circle 19 in Readers' Service Dept.)

WEIGHT TABLES—Jos. Dyson & Sons, Inc., has published a 72-page booklet containing useful weight tables of steel. In this booklet are weights of round, square, hexagon, octagon, and flat steel bars. Eleven tables give the weights of round and square steel bars in sizes from 1/8 inch through 47 7/8 inches in lengths of one inch, one-eighth of an inch, and one foot. Similar comprehensive tables give the weights of square, round, hexagon, and octagon steel bar, to the hundredths of a pound. This handy reference booklet has thirty-four tables of flat steel bars covering thicknesses from 1/16 of an inch through 11 7/8 inches in widths ranging from 1/8 inch through 23 3/4 inches in pounds per lineal inch. In addition decimal equivalents, tables of area and circumferences of circles, and other formulas are listed.

(Circle 20 in Readers' Service Dept.)

BOILERS—A new line of waste heat boilers is described in Bulletin 1700 released by the International Boiler Works Company. The bulletin contains engineering drawings and specifications on this specialized line of International-LaMont forced recirculation generators designed to make maximum use of waste heat from industrial and process heat sources. According to the bulletin, these advanced design generators incorporate the basic LaMont principles of high velocity circulation through small diameter tubes with a patented orificing method to assure uniform flow distribution.

(Circle 21 in Readers' Service Dept.)

SALT—The use of salt for road stabilization, a growing practice on primary and secondary roads at local, county and state levels, is covered in detail by the Salt Institute's new 24-page booklet, "Salt for Road Stabilization." The booklet, which uses photo illustrations of construction methods, was compiled by research scientists and veteran highway engineers from the salt industry on new and old roads. It covers methods, applications, and advantages of salt stabilization. Design and materials, construction procedures, and maintenance and equipment needs are treated in detail, and more than a dozen case histories from the United States and Canada tell of experience with salt stabilization over a period of years.

(Circle 22 in Readers' Service Dept.)

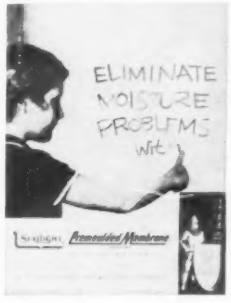
TUBING TOOLS—A complete line of tubing tools is presented in a new 32-page catalog by The Imperial Brass Manufacturing Company. Catalog No. 3121 is of vital interest to anyone who deals with tubing in such fields as maintenance, instrumentation, plumbing, heating, air conditioning, automotive, farm and other mobile equipment as well as dozens of others. It shows over seventy-five different Imperial tools and kits for all tubing work—cutting, flaring, bending, reaming, swaging, pinch-off, refacing and sizing. It also contains complete data on such miscellaneous items and service aids as test caps and plugs, air nozzles, blower, machinery cleaners and drum faucets.

(Circle 23 in Readers' Service Dept.)

ESTIMATING—Can the supporting structural system for estimating deep excavations be rapidly selected? Yes! And in 30-seconds. To make this possible, the engineering has been worked out by Contact Sheeting, Inc., division of Coakley & Booth, Foundation Contractors, for the use of architects, engineers and contractors in estimating. This data is included in a 4-page brochure which describes how the new Contact Sheeting system supports deep excavations.

(Circle 24 in Readers' Service Dept.)

VAPOR SEAL—W. R. Meadows, Inc., announces the availability of catalog No. 1660. This catalog discusses in a scientific manner the need for a true vapor seal in modern construction.



Graphically, it illustrates how Sealtight "Premoulded Membrane" Vapor Seal is claimed to meet this need . . . covers application information, specifications and installation data.

(Circle 25 in Readers' Service Dept.)

LEVELING KIT—Keuffel & Esser Company has announced publication of a new brochure which describes the components and operation of its new Optical Leveling Kit. Entitled "A New Approach to Leveling," the booklet contains full data on industrial alignment problems and solutions, including foundation or bed leveling, profiling, differential leveling and checking movement of equipment. It also provides product data on all component parts and available accessories such as tripods and related instrument supports.

(Circle 26 in Readers' Service Dept.)

TRACTORS—A booklet published by the Ford Motor Company contains thirty-three action photos showing Ford loaders, backhoes, dozers, earth-equipment in use with Ford tractors. The applications described include heavy and light excavating; heavy and light loading; scraping, leveling and grading, and lifting, towing and general utility. The booklet is entitled "Ford Tractors, Equipment for Construction."

(Circle 27 in Readers' Service Dept.)

ELECTRIC EYES—Photomation, Inc., has released an unusual 6-page brochure which covers new, vital information and developments in design and application of "electric eyes." Included in this literature is an interesting comparison between the human eye and the photo "electric eyes." In addition a comprehensive description of their application in automation and general industry is reviewed, along with drawings which reveal in detail construction and a wide range of typical installations. This brochure accentuates the element of versatility of the miniaturized measuring instruments.

(Circle 28 in Readers' Service Dept.)

DRAINAGE—A 4-page folder, recently published by Johns-Manville, describes the use of Transite underdrain pipe in subsurface drainage systems for highways, airports, flood control projects, plant sites, and similar projects. TR-246A contains photographs showing how Transite perforated asbestos-cement pipe is installed and assembled utilizing its unique plastic coupling. In addition, drawings illustrate how modern subsurface drainage practice has been followed in determining hole sizes, distance between holes, and method of perforation for the various sizes of Transite under drain pipe. The size include 6-, 8-, 10-, and 12-inch diameters. Lengths are 10' and 13'. The minimum crushing strengths (ASTM 3-edge bearing method) are also shown.

(Circle 29 in Readers' Service Dept.)

These listings are informational only and are not an endorsement of the products, nor of the manufacturer's claims. To receive any of the new literature described in these columns, merely circle the item number in the Readers' Service Dept. and mail to AMERICAN ENGINEER.

Pres. Noah Hull Announces 1960-61 NSPE Committees

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Thoughts on Professionalism...

By PAUL H. ROBBINS, P.E.
NSPE Executive Director

Engineers and Politics

IF repetition gives authority to a statement, there can be little doubt we are facing "critical years" brought about by the "explosion of technology." These seemed to be the best-known words in the vocabularies of the political speakers who paraded before the television and radio microphones at the political conventions.

THE fact that these two phrases were linked so often in political oratory underscores a responsibility engineers and scientists are only beginning to realize is theirs. For just as perhaps some of the critical problems of the next few years have been caused by the express train advance of technology, so technically-trained people should lend their talents to their solution. Unfortunately, many trained as engineers and scientists used to feel (and some still do) that it is beneath the standards of professional behavior to enter into political debate, activity, or concern for problems of government.

ENGINEERS and scientists today cannot afford the luxury of continued aloofness to these problems. It behooves each professional engineer to personally be active in governmental affairs, for in a democracy we get the kind of government in direct proportion to the composite interest of the voters.

YOUR National Society has developed and presented to each of the parties a platform of action to benefit the country by encouraging conditions whereby engineers can better serve the national welfare. Each engineer would do well to inform himself on these issues. He could serve his profession by discussing them with the candidates of both parties between now and the election. Each chapter this fall could well hold a discussion on the issues and encourage members to discuss with others these important subjects

BECAUSE of their orderly thinking processes, engineers can be of considerable help to the party of their choice in discussing many of the issues to be considered in the campaign. Most important, however, is that all of us recognize that only as we are vocal and active in our particular parties may we expect to have any influence after the elections.

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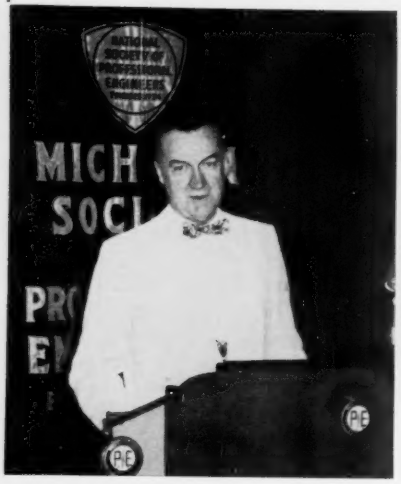
NSPE Meets in Denver, Oct. 18-21

A committee of the Professional Engineers of Colorado has been working for nearly a year on plans for the fall meeting of NSPE to be held in Denver, October 18-21. With Colorado at its most colorful in the fall, the committee has made arrangements for the activities to be held in two of the State's major cities, Denver and Colorado Springs. Most of the business of the fall meeting will be held in Denver's plush new Denver Hilton Hotel, shown at left, where more than twenty-five of the nation's leading firms and associations will have displays in a massive exhibition area. And a "fun" day has been scheduled for Friday, October 21, with all attending the fall meeting boarding buses for Colorado Springs, where there will be a briefing at the top-secret North America Air Defense Command headquarters, a tour of the multi-million dollar Air Force Academy, shown at right, a show at the AFA Planetarium, and a social evening at the Air Force Academy Officers Club. While there will be a full schedule of serious meetings, discussions and seminars, the Arrangements Committee, headed by Sam Hawkins, is going all out to show the rest of the nation "Colorado Western Hospitality."

12th Annual Meeting Held in Michigan



Dr. R. J. Saulnier, left, chairman of the economic advisory council to President Eisenhower, addresses the delegates to the thirteenth annual convention of the Michigan Society. Selected as "Engineer of the Year" by the Michigan SPE was James Harold Foote. Presenting the award to Mr. Foote in right photo is Frederick Von Voigtlander (standing at the right), chairman of the Awards Committee of MSPE and national director of NSPE. Seated, l.r., are: Mrs. Foote; Richard A. Little, secretary, MSPE; Mrs. O. N. Saulter; N. O. Saulter, president, MSPE; Dr. Saulnier, guest speaker, and Mrs. Saulnier.

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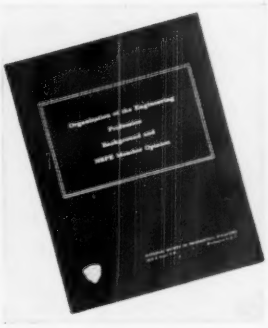

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(Continued from page 28)

ernment. Others who do not have an applicable item on which to base submittal of a piece of equipment would like to convince the Government agency that only a new development will answer the need. The XYZ company is one of these.

AFTER talking at great length with the Government representatives, both in the midwest and in Washington the XYZ company's sales engineering representative returns to the company and submits to the Proposal Review Board, which generally includes representatives of Management, Sales, Engineering, and Manufacturing, a recommendation to undertake a company sponsored program to develop a concept to satisfy the universal tester requirement. The Proposal Review Board establishes a budget of $10,000 which is charged into the overhead expense of the company and allocated to all contracts, for the preparation of an unsolicited proposal. The proposal engineer on this unsolicited proposal deals directly with the Government and as many of the prime missile contractors as he can get to assist him in this program and submits a

Receive Introductory Memberships

Five Seattle engineers received introductory memberships from the Seattle Chapter of the Washington Society of Professional Engineers at a recent meeting of the group. Presenting the certificates is L. R. Durkee, a Seattle Chapter member and a director of the National Society of Professional Engineers. Shown receiving their memberships are, l.-r.: Ken Emerson; Roe Willard; Don Garen; Demetrios Vassilakos, and Otto Binder.

Lincoln Chapter Installs Officers

Left: The Lincoln Chapter, Pennsylvania Society of Professional Engineers, held the election and installation of officers at its annual meeting. John T. West, as one of his last official acts as executive secretary of the State Society, is shown installing and congratulating the incoming officers. The new chapter officers are as follows: president, Russell E. Horn; first vice president, Jules M. Forman; second vice president, Willard R. Zahn; secretary, Harry O. Wagner; assistant secretary, Robert H. Lake; treasurer, William H. Shank; State director, Gery McLaughlin, Jr.; alternate State director, George Barton, and new chapter directors (three year terms), Russell D. Allen and Albert H. Spinner, Jr. **Right:** The Chapter presented its first "Engineer of the Year" award to Charles F. Stephenson. The award was presented by Howard Slagle, outgoing State director for the Society, during the annual meeting.

proposal which includes a specification describing the equipment, a justification of the specification, and a proposed schedule and cost.

Meanwhile, the Government agency has received a number of proposals from other contractors and has been evaluating equipment submitted for experimentation and testing. It has reached the conclusion that it will have to fund the development of a new piece of equipment under a Government contract. It is now heavily committed to as many as twenty contractors who have spent their own time and money to assist in the establishment of the requirement. The agency decides the only equitable way to choose the company who will receive the contract is by competitive negotiation. It does not establish a formally advertised competition since there are only a limited number of people capable of performing this work, and since the specifications are classified.

The XYZ company and approximately twenty other companies are requested to submit bids. Some twelve of these companies decide to go ahead and prepare proposals. Each proposal costs several thousand dollars to prepare which is again charged to the overhead of the individual contractor. The formal proposal when submitted goes into great detail as to the contractor's past experience and capabilities, his method of operation both technical and administrative. The contractor's cost estimate is submitted in great detail. It includes the numbers of hours to be spent by each category of Engineering and Manufacturing personnel; the average labor rates; the overhead rates, and the profit or fee rates. It also includes information on current labor and overhead rates; special tooling costs; methods of handling overtime premiums, and a number of other statements about the administration of the contractor's finances.

After the twelve bids have been evaluated, the agency finds that the XYZ company has the best technical proposal, but has some cost and administrative elements which they desire to negotiate. These negotiations include a discussion of the fee which has been established as a percentage of the total cost of the engineering, manufacturing, and other direct and overhead costs involved in the program. The XYZ overhead rates are questioned and Government auditors are sent into the plant to check these rates and make certain they are those presently being experienced. The classifications of the engineers to be employed on the job are carefully checked to make certain they are compatible with the salary rates shown in the proposal. The XYZ company felt it had originated during the preparation of its unsolicited proposal some excellent new concepts that are patentable. The Government insists that royalty free rights to all of these concepts be granted so they may be applied in any future programs of the Government. In addition, the Government questions the number of hours which the XYZ company feels are necessary for the initial design study, and the XYZ company reduces these hours by a substantial percentage.

Having completed these negotiations, the XYZ company receives a cost-plus-fixed-fee contract which will entitle the company to reimbursement of its complete costs, regardless of whether they are equal to, less than, or more than the estimate established by the negotiation, plus a fixed fee (in dollars) established at the negotiation. The company proceeds with the development of the equipment and is successful. It then prepares specifications and drawings for the production of the unit. It endeavors to negotiate "follow-on" contracts with the Government without any further competition. These "follow-on" contracts can include engineering of new and improved versions of the universal tester manufacture of additional units, and service of the equipment while in operation.

Eventually the concept of the universal tester is well established, and the Government decides to procure several hundred per year. All of the documents of the XYZ company pertaining to this equipment are now in the hands of the Government. The XYZ company is then required to compete with other companies each year for the additional "follow-on" quantities.

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About the Author . . .

Mr. Chapman

Robert B. Chapman, III, is a registered professional engineer in the State of Maryland, and is now practicing in a number of diverse engineering fields as the executive vice president of Aircraft Armaments, Inc. He is an honor graduate of the Johns Hopkins University in 1938, receiving a B.E. in civil engineering. He was employed by the John E. Greiner Company, Consulting Engineers, from 1938 to 1940.

From 1940-1950, he was employed by the Martin Company. For approximately four years, ending in December, 1945, he was on active duty with the Army Air Corps, leaving the service as a lieutenant colonel. He joined Aircraft Armaments, Inc., a few days after its organization in August, 1950.

THE Policies, Canons, and Rules of NSPE are for the most part, applicable to the Federal research and development industry. However, there are areas of apparent conflict in the sections dealing with "relations with clients and employers" and "relations with engineers." Some of the NSPE statements which must be examined in comparison with the practices of the Federal research and development industry are quoted as follows:

"NSPE shall be concerned only with Federal appropriations for proposals involving engineering services."

"The selection of engineering services by the evaluation of these qualities (technical training, broad experience, personal ability, honesty and integrity) should be the basis of comparison rather than competitive bids."

(Continued on page 52)

Membership Award

A high point of a recent meeting of the Nassau County Chapter, New York State SPE was the honoring of Membership Chairman Robert Stewart. He was presented with a gavel and scroll for the winning of the state-wide contest among chapters for enrolling the most members during the membership drive. Shown are Russ Heirs, left, Mr. Stewart and Chapter President Anthony Giardina.

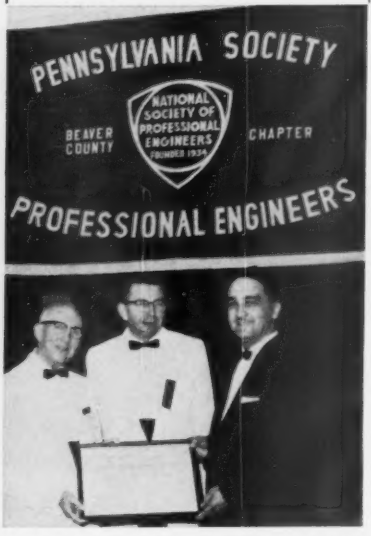
Special Colorado Committee

The State board of directors of the Professional Engineers of Colorado recently authorized a committee to study and report on the objectives of the State Society. The members of the committee are past presidents of PEC. With this impetus, Denver's Metropolitan Chapter set aside a recent meeting for all members to discuss the objectives of the organization. A large attendance entered into a most worthwhile discussion and many new ideas were advanced. Seated at the head table were members of the Objectives Committee together with Metropolitan Chapter president, James G. Johnstone. Shown, l.-r., are: Hugh W. Hempel, Wilbur H. Parks, Sam H. Hawkins, J. Loren Adams, Mr. Johnstone, Howard A. Lane, George C. Hahn, and Orley O. Phillips.

Tulsa Chapter Officers

New officers of the Tulsa Chapter, Oklahoma Society of Professional Engineers, are, l.-r. (seated): Frank J. Meyer, programs and meetings vice president; F. M. Bartlett, president; Paul H. Johnson, public relations vice president; Bill Wilson, director, and (standing): Jack B. Cornett, membership vice president, and Charles R. Keithline, secretary-treasurer. Not present when photo was taken were Gordon A. McCune, executive vice president, and Frank B. Andrews, director.

West Honored



Manfred C. Massa, right, retiring president of the Beaver County Chapter, Pennsylvania SPE, presents a certificate of service to John T. West, retiring executive secretary of the PSPE. In center is G. E. Brock, PSPE vice president.

By Mrs. Clark A. Dunn, Chairman, Ladies Auxiliary Advisory Committee.

A new regime is about to begin for the Ladies Auxiliary Advisory Committee of the National Society of Professional Engineers. It is the hope of the new officers that the next year will be as successful as the past one was under the able leadership of Mrs. Garvin H. Dyer.

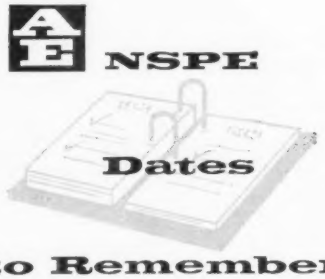
Mrs. Clark A. Dunn ►

The new slate of officers elected at the annual meeting in June in Boston is as follows: Chairman—Mrs. Clark A. Dunn, 317 N. Husband, Stillwater, Okla.; N. E. Area Chairman—Mrs. Henry Vermont, 81 Metropolitan Oval, Bronx 62, N. Y.; S. E. Area Chairman—Mrs. H. P. Derry, 1006 Sixth Ave., Albany, Georgia; N. Central Area Chairman—Mrs. C. Ray Hanes, 581E Dominion Blvd., Columbus 14, Ohio. Central Area Chairman—Mrs. Howard Honefenger, Rt. 1, Clayton Road, Manchester, Mo.; S. W. Area Chairman—Mrs. John Pratt, 7121 Greenbrook Lane, Dallas, Tex., and Western Area Chairman—Mrs. Fred M. Johnson, 1034 Princeton Ave., Modesto, Calif.

It is the desire of this Committee to serve all of the auxiliaries in the best possible way. It is suggested that any auxiliary presidents having news items or problems of any kind write to her area chairman or to the national chairman. Also, if any group is interested in organizing an auxiliary, they should write to the area chairman nearest them for information on how to proceed. There are now more than 100 active auxiliaries in the United States and many more are in the process of organizing.

The annual meeting in June was very enjoyable from the standpoint of the ladies. A vote of appreciation is certainly due the wives of the Boston professional engineers and Mrs. Benjamin Mills, Jr., in particular for providing such a superb program. We enjoyed entertainment which only Boston can provide. Sightseeing trips were made to historical points of interest and to educational Boston and Cambridge. A special treat was the concert of the famous Boston Pops Orchestra under the direction of Arthur Fiedler. The clambake at Nahant was a new experience to most of us and was thoroughly enjoyed by all.

The business meeting of the Auxiliary Committee was well attended and the reports were well received. The report which Mrs. Dyer gave to the NSPE general meeting created so much interest that copies are being made to be distributed to all of the Auxiliaries. The interest shown and cooperation received from the National Society of Professional Engineers is very gratifying.



to Remember

West Virginia Society of Professional Engineers—Annual Meeting, September 22-24, 1960, Greenbrier Hotel, White Sulphur Springs, West Virginia.

Virginia Society of Professional Engineers—Annual Meeting, October 13-15, 1960, Monticello Hotel, Charlottesville, Virginia.

National Society of Professional Engineers—Fall Meeting, October 19-21, 1960, Statler-Hilton Hotel, Denver, Colorado.

Professional Engineers of Colorado—Annual Meeting, October 20-22, 1960, Statler-Hilton Hotel, Denver, Colorado.

Maine Society of Professional Engineers—Annual Meeting, November 12, 1960, Augusta, Maine.

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CIVIL

(Continued from page 37)

precast and prestressed. The 107-year-old American Society of Civil Engineers publishes a healthy stream of technical literature and sponsors numerous lectures, symposiums, and conventions well supported by its membership of more than 44,000.

BUT in the last analysis, scientific theory can play only a limited role in the civil engineer's endeavors. For one thing, the materials with which he deals are never pure nor "ideal." This is particularly true of the soils and rocks of the earth's crust which are at once his primary medium and adversary. The pragmatic and empirical approach remain essential to the practice of civil engineering, and the capacity for the master builder's intuitive "judgment" is highly prized in the profession. Also making demands of a practical nature are the economic, social and political problems central to most civil engineering undertakings. And always inherent in the design of structures is the imaginative and aesthetic consideration, which has most recently been dramatized by such engineers as P. L. Nervi of Italy.

To the extent that civil engineering is a craft, a social activity and an art, it is bound to be somewhat less of a science. But for this the civil engineer is not apologetic. In an age of specialization he takes pride in maintaining contact with the diverse elements which constitute in his view the essentials of the true professional life. And he is not at all ready to surrender his role in the human drama to a new generation of space engineers.

That the peoples of the world are enchanted by the beginnings of space exploration cannot be denied. But perhaps both the Americans and the Russians have overestimated the significance of this enchantment. The peoples of other nations are, after all, committed to aims and programs much more immediate and in many ways no less exciting than probing into space. Plans are underway for a suspension bridge across the fabled Bosporus at Istanbul, and for what would be the longest bridge in the world, across the Messina Straits between Italy and Sicily. The Chinese have for the first time spanned the Yangtze River. The reclamation of land from the Wadden Sea continues relentlessly in Holland as it has for centuries. A 1,363-mile highway is being carved out of the Brazilian jungle, linking that nation's new capitol city to the sea. In Australia, India, and the Middle East immense irrigation projects are underway which will reclaim for cultivation vast, arid portions of the earth. A beautiful prestressed concrete bridge spans the lagoon at Abidjan, French West Africa, and on the River Zambezi the Federation of Rhodesia and Nyasaland has just completed the Kariba Dam.

Nor does it end with dams, bridges and roads. In their wake come housing developments, schools, libraries, churches, hospitals, theatres, concert halls, museums, sports stadia, recreation areas and marinas. These are the dreams that have smoldered in men's hearts for generations, and they will not be extinguished no matter how thrilling the prospect of travel to the moon and beyond.

Indeed, the civil engineer has vision and ambition to challenge generations yet unborn. A tunnel under the English Channel; development of the great river basins of the world; dams across the Straits of Gibraltar and the Dardanelles resulting in the reclamation of tens of thousands of square miles of land from the Mediterranean; utilization of power from the sun, wind, tides, volcanoes—these are just a few of the projects being studied. Recently, a Russian engineer has proposed the construction of a great dam across the Bering Straits between Siberia and Alaska, which would, in addition to linking the two continents of Asia and North America, alter the ocean currents and moderate the climate in the now frozen wastelands. The cost of this project is estimated at 17½ billion dollars, less than half the annual arms budget of the United States.

HOWEVER, anxious to show the uncommitted nations that our scientific and technological accomplishments are equal or superior to that of the Russians, and hoping thus to maintain respect and to win friendship for our nation and our cause, the United States Government has embarked on a crash program of space exploration. But the civil engineer believes that respect and friendship are more likely to accrue to that nation which best assists the underdeveloped nations to achieve the goals which they have established for themselves right here on earth. These countries have already learned much in the fields of medicine and agriculture, but improvement in health and nutrition has carried the seeds of a new crisis, the much talked-about "population explosion." The almost complete failure of efforts in birth control leave only one immediate solution to this crisis other than war, and this solution is, simply, an imaginative world-wide program of engineered public works to provide the land, water, housing, roads and utilities for the new multitudes, as well as work to occupy their hands and goals to lift their spirits. The nation which leads the way in this undertaking cannot help but reap an unprecedented harvest of friendship and influence. The potentialities are explosive, as we learned to our sorrow in the Aswan High Dam debacle.

Much good work is already underway under the auspices of the Technical Cooperation (Point Four) branch of the International

About the Author . . .

Mr. Florman

Samuel C. Florman is vice president and treasurer of Kreisler-Borg Construction Co., general contractors, of White Plains, N.Y.

A native of New York City, he received his B.S. degree *summa cum laude* from Dartmouth College in 1944. In 1945 he was commissioned in the Navy Civil Engineer Corps and served in the Pacific area on advance base construction.

He received an M.A. degree from Columbia University in 1947, and the following year went to Venezuela as field engineer for the Hegeman-Harris Company. Prior to joining Kreisler-Borg in 1956, he spent five years with Thompson-Starrett Co., Inc., and two years with Joseph P. Blitz, Inc.

Cooperation Administration. As a matter-of-fact, the Russians are as anxious to catch up with us in this activity as we are to overtake them in the field of rocketry. The civil engineer is confident that the really important ideological battles will be fought in the arena of cooperative development of resources, and that the space explorers will soon come to be considered in the same light as mountain climbers—admirable and courageous, but outside of the main stream of human endeavor.

It may seem presumptuous for the civil engineer to dissent from the popular acclaim for the advent of the Space Age, and to think of human destiny in terms of his own profession. But he knows that *his* works are works of peace, capable of redirecting much of the energy now being wasted in barren hate and frustration in underdeveloped nations, and in the equally fruitless arms race in the technologically advanced nations. He knows that when he tames devastating floods and makes the desert bloom his work is good, and he has experienced the deep personal satisfaction of good works soundly executed for the public benefit.

Goethe's epic hero, Faust, the symbol of modern man in search of fulfillment, yearned to find a single moment to which he might say, "Oh linger on, thou art so fair!" In the company of Mephistopheles he toured heaven and earth, on the nineteenth century equivalent of a rocket ship trip into space, but to no avail. However, in Part II of Goethe's poetic drama, Faust finally does find the moment of complete satisfaction for which he has been searching all his life. He finds this precious moment participating in a dike-building and land reclamation project!

With Goethe's vision of man's salvation the civil engineer rests his case. In all heartiness he can join with his fellow engineers in celebrating engineering's contribution to space exploration, confident that the symbol of National Engineers' Week will soon again be a dam, a road, a canal, a building, or, best of all, a bridge—which remains the most eloquent symbol of man's faith in the future.—**End.**

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INDUSTRY

(Continued from page 47)

"Competition between engineers for employment on the basis of professional fees or charges is considered unethical practice by all professional engineering groups."

"Fees should be negotiated on a basis of a percentage of the construction cost rather than a percentage of the cost of producing the physical evidences of architectural and engineering work."

"The procedure of detailed comparison of administrative costs, overhead, time of principals in supervising the work, and similar items should be discontinued as the primary basis of negotiation."

"Any firm offering engineering services must, in conformance with the laws of the state in which it operates, have its operations and control under the direction and responsibility of registered professional engineers."

"This Society does not approve of the sales methods of those equipment manufacturers, suppliers of materials, and contractors who advertise and offer free engineering services."

"His plans or specifications will not be such as to limit free competition, except with his client's consent."

"He will not be financially interested in the bids as or of a contractor on competitive work for which he is employed as an engineer unless he has the consent of his client or employer."

"A client does not acquire any right to the ideas developed and plans made by a consulting engineer except for the specific case for which they were made."

"He will not review the work of another engineer for the same client except with the knowledge or consent of such engineer."

It is not my purpose to draw conclusions as to the actual conflicts between the NSPE policy and the practices of the Federal research and development industry. It has been recommended that the Baltimore Chapter request the Maryland Society of Professional Engineers to prepare and submit a hypothetical case covering all of

these policies and rules to the National Board of Ethical Review in accordance with By-law 28 of the National Constitution and By-laws. The board of directors of the Baltimore Chapter has agreed that it will initiate action on these recommendations during the next operating year. It is hoped that the Board of Ethical Review would then provide an opinion for the guidance of the state and local societies and would also consider whether there was a need for modification or expansion of the Canons of Ethics or the Statements of Policy which have been previously adopted by the National Society.

It is interesting to speculate on the possible various alternative findings open to the Board of Ethical Review upon reviewing a hypothetical case of this nature. *First*, in the event that they find that the present Federal legislation and Armed Services Procurement Regulation impose unethical practices on professional engineers in research and development industries, the National Society could then propose revised Federal legislation. It is my personal belief, based on my recent experience in dealing with Congress in this area, that such legislation would have no chance whatsoever of being enacted. The majority of the Congressmen and Senators are deeply and publicly committed to increasing the competitive aspects of research and development procurement, and of increasing the surveillance and the entrance of governmental review bodies into the private affairs of the industry. Conversely there have been some indications of a desire on the part of Congress to impose similar competitive practices on the "architect-engineer" or "construction" industry. *Second*, in the event that the Board of Ethical Review finds that the rules and policies in question apply only to that portion of the engineering profession which is variously described as "architects and engineers," "consultants," "construction," they could prepare a second set of Canons and Rules which would then apply to the engineers working in the federal re-

(Please turn the page)

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search and development industry. This does not appear very logical since there should not normally be two ethical or professional approaches to the same problem. It is much more logical to suppose that the Policies, Canons, Rules, etc., would be rewritten on a broad enough basis to provide direction to all engineers, regardless of the industry in which they were engaged. *Third*, in the event that the Board of Ethical Review determines that the Policies and Rules in question apply only to engineers who are working as consultants or as substantial managers of their own actions, there would not be any real solution for those who are both professional engineers and executives or managers in industry. *Conclusion*—It appears very logical that a review of a hypothetical case based on the Policies and Rules in question will result in recommendations to the national body to adopt revised and broadened Policies and Canons.

Finally, there is an important factor which should be considered. Industry in general has not considered it necessary to encourage its eligible engineers to request registration. The national and state societies have been encouraging industry to take positive action to register all its eligible engineers; the state boards require that contractors include registered professional engineers among their personnel before they can advertise or make known the fact that they can provide "engineering" services; there is strong evidence that many companies are about to institute major programs to encourage registration. Once this occurs, it is probable that the majority of the registered engineers and, consequently, the majority of the members of the National Society of Professional Engineers will be in industry rather than in the "architect and engineers" or "consultant" offices. It is essential that the Policies, Canons of Ethics, and Rules of Professional Conduct of the National Society of Professional Engineers give guidance to all of its members and not to a limited segment of its membership.—End.

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Oklahoma 1960-61 Officers

OFFICERS AND DIRECTORS of the Oklahoma SPE for 1960-61 were installed at a recent meeting. They are, l.-r. (seated): Ralph Randall, secretary-treasurer; W. R. Clarke, president-elect; Wm. J. Collins, Jr., vice president, and R. F. Danner, national director. Directors (standing) are: V. L. Costello; Aubrey Weatherholt; Chas. B. Gannaway, Jr., C. W. Neal; Gomer Bittle, and Herman E. Smith. ►

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California Society Holds Annual Meeting

Taking a prominent part in the recent twelfth annual meeting of the California SPE were, left photo, l.-r.: Ray Berbower, Long Beach Chapter president; Leo Ruth, CSPE past president; Willard Holt, new CSPE president; Douglass Judd, new first vice president, CSPE; Gordon Stiles, outgoing CSPE president;

Philip Helsey, president, California Legislative Council of Professional Engineers, and Harold Mosher, 1959-60 NSPE president. Chapter, state, and national presidents pose at right. Shown are, l.-r.: Mr. Stiles, outgoing CSPE president; Mr. Mosher, past NSPE president, and Mr. Berbower, Long Beach Chapter head.

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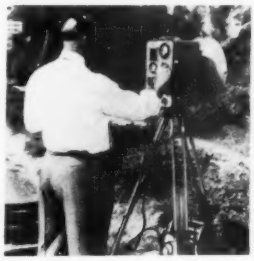
Progress in Products

ELECTROTAPE — Item 30

Cubic Corporation has scored a major breakthrough, giving new electronic eyes to the ancient art of surveying. The breakthrough is an electronic tool, based on continuous-radar principles, which provides surveyors instantaneous information as it measures distances from 250 feet to 50 miles. With the unit, called "Electrotape," surveyors can chart hundreds of miles in a normal working day, it is claimed.

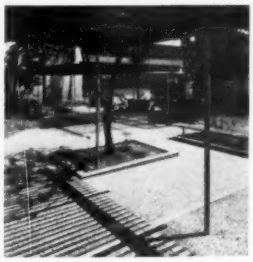


PARA-PAQUE — Item 31

Para-Tone, Inc. has announced details on Para-Paque, a multi-use overlay and opaquing medium. An adhesive-backed, transparent film, dimensionally stable, it can be used for masking, blocking or opaquing in their preparation of artwork, blueprints, photo negatives and positives. The material is a light-safe, deep red film that *completely* blocks the passage of light—up to fifteen times normal exposure, it is claimed. It has been field-tested on 150 watt blueprint and whiteprint machines, down to ½ foot per minute. Para-Paque is highly transparent, further facilitating fast, easy, accurate use in overlays and opaquing.

COLORFULL CONCRETE — Item 32

An innovation in the contracting business is the use of Colorfull concrete. For the first time, a practical, economical, completely usable method of introducing color into the ready mixed truck at the time of manufacture of the concrete has been made possible. The resulting product, a thoroughly uniform ready-mixed concrete, contains color clear through the entire mass.

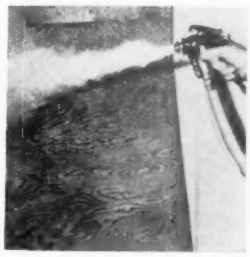


POLYETHYLENE — Item 33

A new sunlight-resistant, clear polyethylene film, which has an outdoor life claimed to be three to four times that of standard, clear polyethylene film, has been added to the Du Pont Company's family of films. The new film, designated Sunlight Resistant polyethylene SR-300, is available in four-mil gauge in a wide variety of widths. It is being marketed by distributors of Du Pont's films for agricultural and construction uses to fill a weatherability gap between standard polyethylene, which has limited resistance to sunlight, and "Mylar" polyester film Type W, with four to seven years' weatherable life, according to the manufacturer.

PROTECTIVE COATING — Item 34

Fiberglas Flake Protective Coating, a spray coating providing a corrosion resistant surface to metals, wood and concrete, has been developed by Owens-Corning Fiberglas Corporation. Concurrently, a spray gun unit especially designed for applying the new Owens-Corning product has been developed by the De Vilbiss Company. Accelerated weathering tests have shown virtually no deterioration of the coating, it is said.



TOUGH PLASTIC — Item 35

A tough plastic that has proven itself in hundreds of rugged industrial applications over the past decade has now been given a new look for the consumer market. The Naugatuck Chemical Division, United States Rubber Company, has developed an easy-processing, high-gloss variety of its ABS plastic, Kralastic. The new material, called Kralastic MH, was specifically developed for molded and sheet consumer products. It is claimed that the "development of this new plastic provides the designer of consumer goods with a material that teams exceptional toughness with attractive appearance, and its use should increase public acceptance of plastic."

DRAFTING — Item 36

Automatically balanced for use at any board angle and on boards from small to giant size without adjustment, Universal's new 60 Tracmaster drafting machine is said to provide an exceptional degree of drafting convenience, ease of operation and accuracy. The 60 Tracmaster can lock to a point in one elevation and carry this point vertically or horizontally to another view.

DUCTILITY MACHINE — Item 37

Important test control features for accuracy, and stainless steel construction for easy maintenance—these are the outstanding qualities offered in Soiltest, Inc.'s new AP-101 Ductility Machine for testing the ductility of bituminous materials. The test, which measures the distance to which a bituminous specimen will elongate before breaking when pulled apart at a specific uniform speed and temperature, are covered by the American Society of Testing Materials specifications D-113-44 and by the American Association of State Highway Officials designation T-51-44.

This feature describes new products of general interest to professional engineers. For further information, circle the item number in the Readers' Service Dept. and mail to AMERICAN ENGINEER.

These listings are informational and are not an endorsement of the products, nor of the manufacturer's claims.

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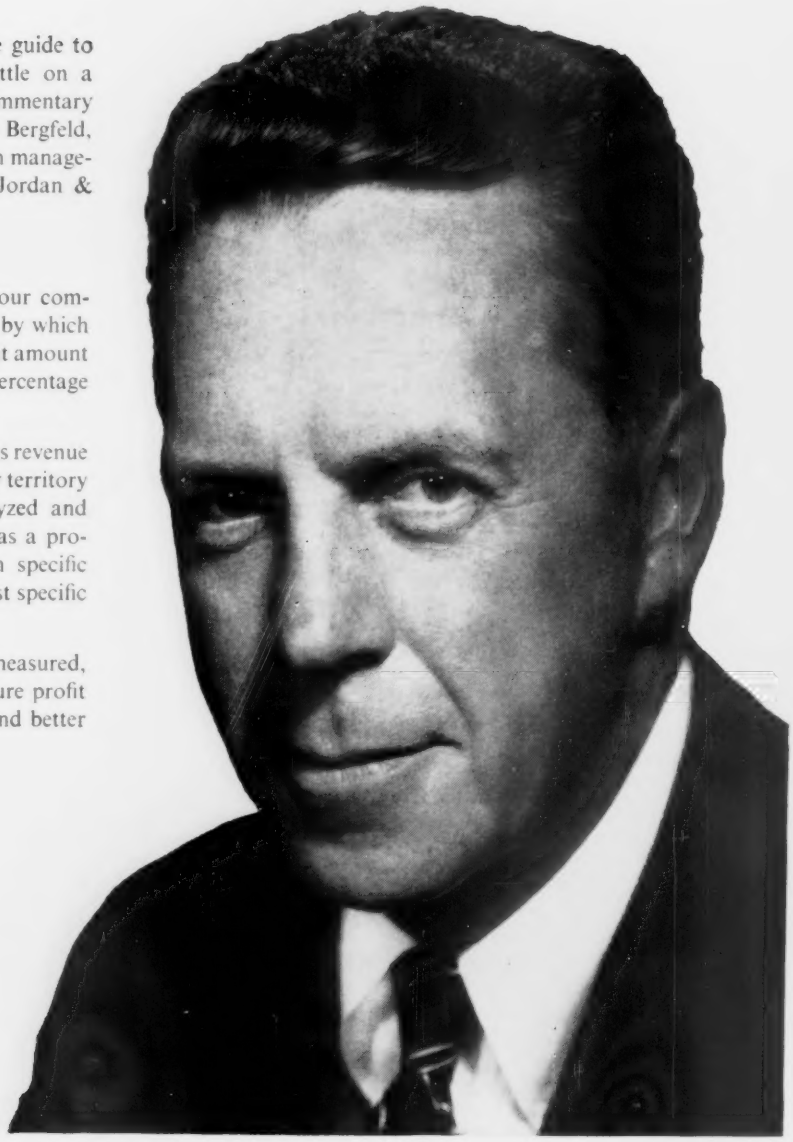

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